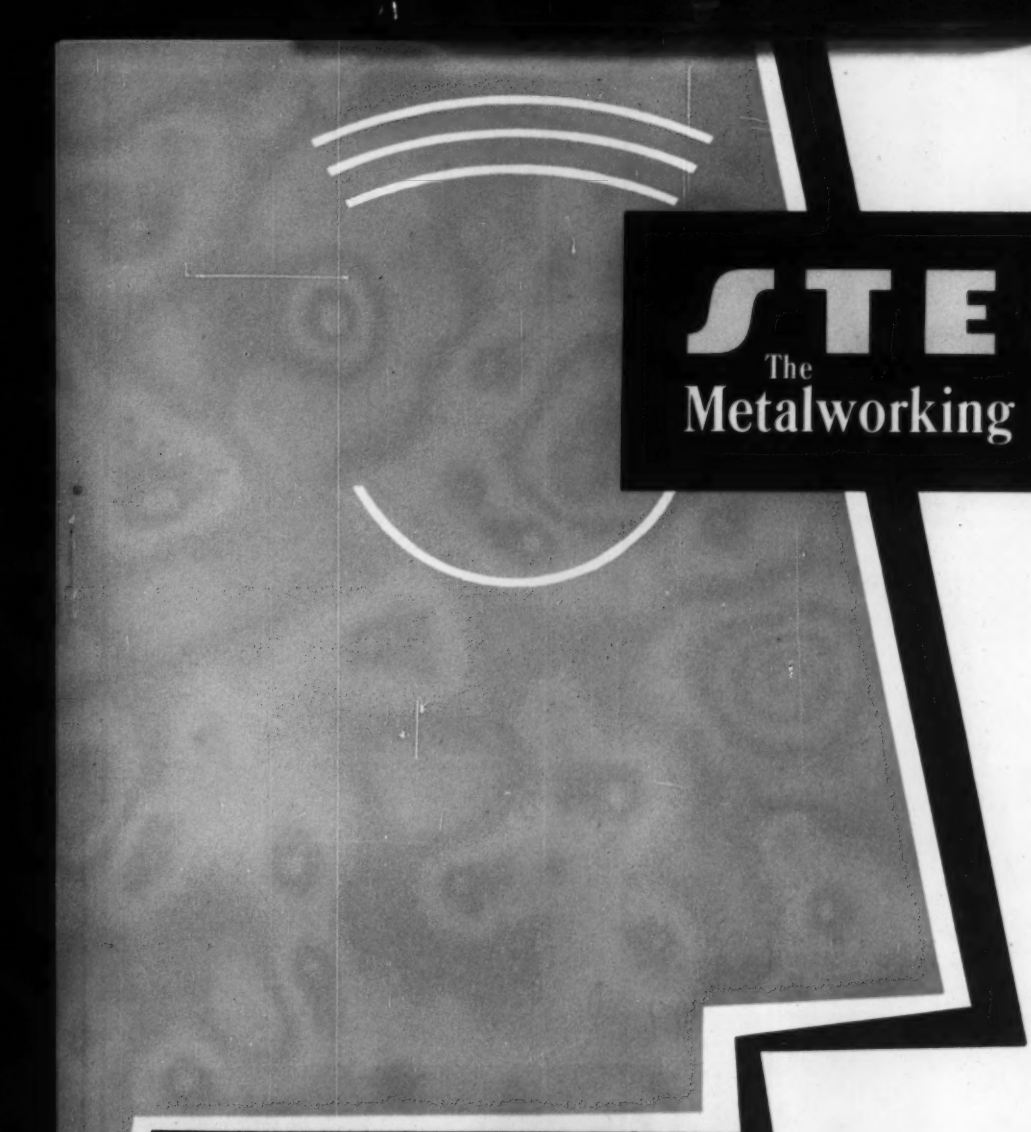
DECEMBER 12, 1955

STEEL
The Metalworking Weekly



and Management

What Labor Wants in '56

Unions will seek the usual boosts in money, SUP, other fringes. Look for industry's strong demands, too—longer, more workable contracts, no interference with rights to manage . . . page 55

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save money, minutes, metal

with B&W MECHANICAL TUBING

CARBON • ALLOY • STAINLESS

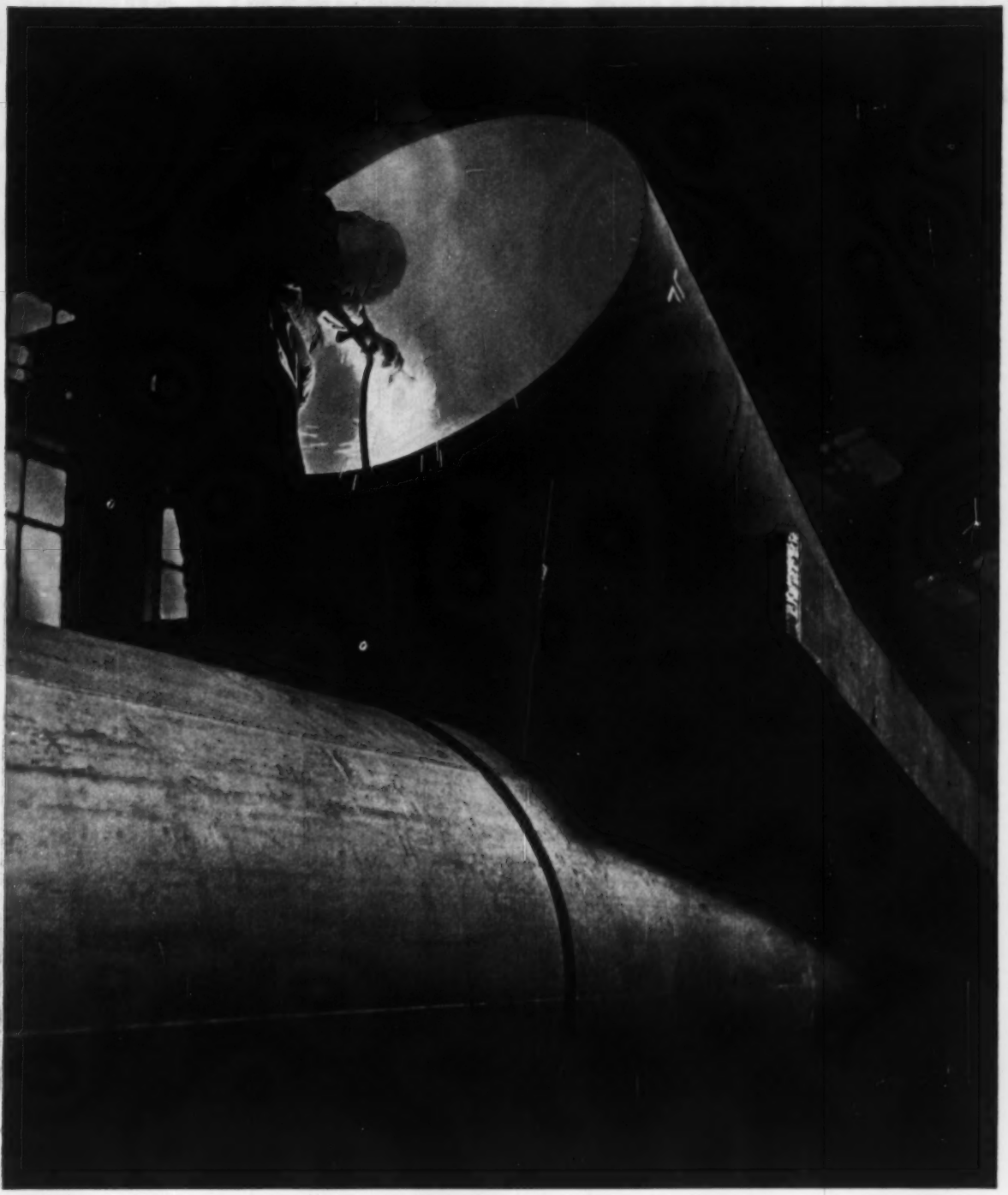
Countless hollow parts and products now being made from solid stock can be fabricated more economically from tubing. The hole is there, eliminating heavy drilling with all its attendant waste. And the wide range of sizes, shapes, analyses, finishes and heat-treated conditions in which B&W Mechanical Tubing is available, make it a semi-finished product in itself—reduce all your machining operations to the minimum.

Get the facts on savings from Mr. Tubes, your link to B&W and your local B&W tubing distributor.

Write for Guide to the Use of Seamless Mechanical Tubing, Technical Bulletin 340 S.

B&W TUBULAR PRODUCTS DIVISION

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa. and Milwaukee, Wis.: Seamless Tubing, Welded Stainless Steel Tubing
Alliance, Ohio: Welded Carbon Steel Tubing
Milwaukee, Wis.: Seamless Welding Fittings TA-5031 (O)



WELDABILITY— In making any type of pressure vessel no factor is more important than the welds. Bethlehem heads are made of uniform steel of high quality, so that with good welding practice tight, sound welds are assured. We make heads in diameters up to 144 in., and in thicknesses ranging all the way from 14 ga to 3½ in. In addition, we produce a full line of saddles, covers, fittings and flanges, as well as other flange-shop specialties.

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AUTOMATIC. You get any desired pressure, constant temperatures and atmospheres . . . automatically! Cuts labor costs.

The storage facilities, pictured above, are part of Phillips Petroleum Company's many installations which help assure you of a dependable, year-around supply of Philgas. Pipelines carry Philgas to strategically situated underground storage facilities, with capacity of hundreds of thousands of barrels. In this manner Philgas, produced in summer, is available to meet peak demands of the winter months.

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Philgas is our name for high quality LP-Gas—Bottled Gas—Butane—Propane

66 Philgas

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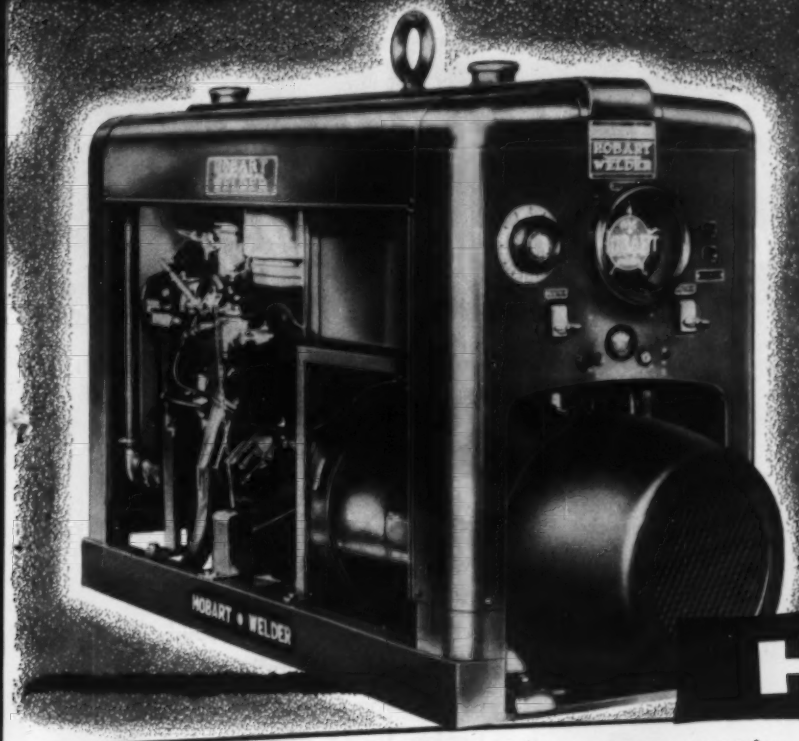

Today's BIGGEST Arc Welder VALUE

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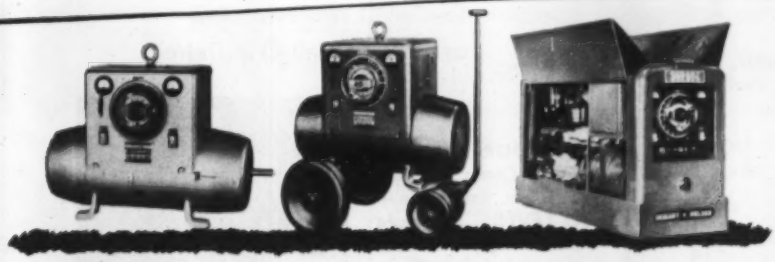
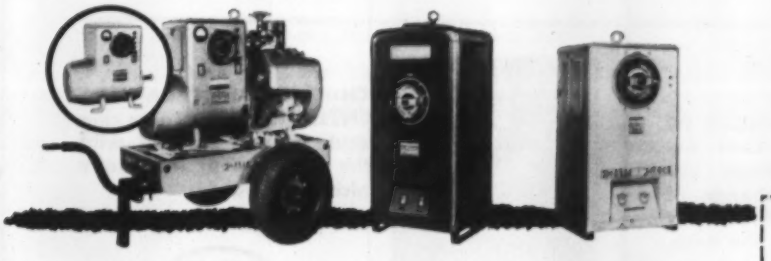


GENERATOR ONLY 200 or 300 amp. with 1 KW 110 volt DC power outlet for "Building-Your-Own" Gas Engine Welder. Has Hobart Multi-Range Control. Simply connect it to your power source.

ELECTRIC DRIVE 300 and 400 amp. welders ideal for production, maintenance and repair service. Conservative rating lets you do heavy duty welding for limited periods of time.

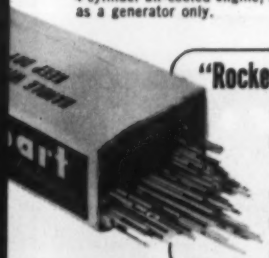
GAS DRIVE WELDERS with 1, 3, or 12 KW auxiliary power. 200 to 600 amp. models for speedy, low cost welding in the field where electric power is not available.



AC POWER-AC WELDER—200 amp. for welding where power is unavailable. Available with 4 cylinder air-cooled engine, or as a generator only.

DC RECTIFIER—300 amp. Has three delta connected transformers, one for each phase . . . a magnetic line switch and overload protection.

TRANSFORMER WELDERS—180 to 500 amp. models for shops that have only single phase power. Start fast and hold a stable arc.



"Rocket 24" Electrodes for AC or DC This sensational new contact type electrode is heavily coated with iron powder which becomes a part of the weld.

Keep in step with modern welding procedures. Try the new Hobart "Rocket 24" electrodes and see how they give you greater speed, maneuverability, strength and smoothness.

Yes, rugged and lightweight! Exactly what you want. You'll be surprised at the variety of jobs you can handle with this 40 volt, "hard-socking" gasoline engine driven welder.

Hobart engineers have gone all out to provide 250 amps. of dependable welding current—yet kept the "Contractor Special" lightweight for easy portability. There has been no skimping—no stripping down—no stepping up engine speed to cut material costs. You'll find nothing to match this "Contractor Special" for completeness of equipment, wide range, economy of operation and long life.

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HOBART BROTHERS CO., BOX ST-125, TROY, O. Phone 21223

Without obligation, please send me complete information on items checked:

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- ☐ AC Power-AC Welder ☐ DC Rectifier
- ☐ Transformer Welders

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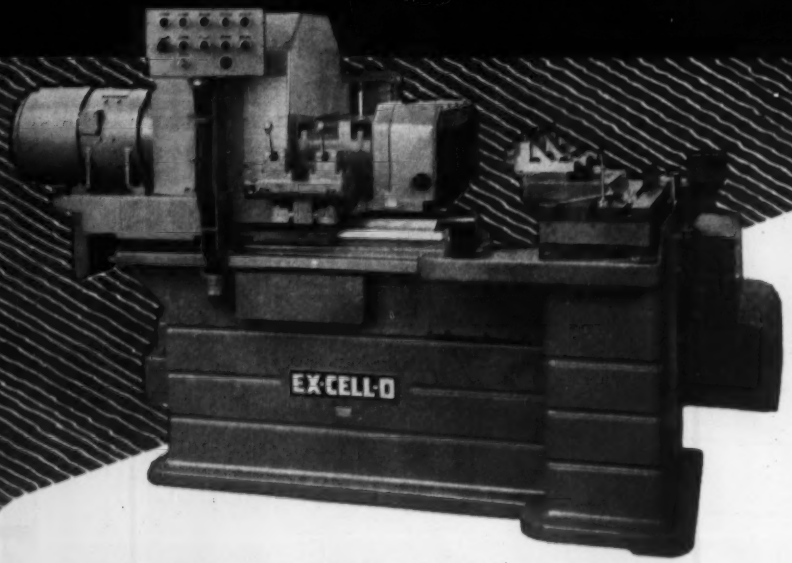
HOBART ARC WELDERS

"ONE OF THE WORLD'S LARGEST BUILDERS OF ARC WELDERS"

NEW EX-CELL-O MACHINE

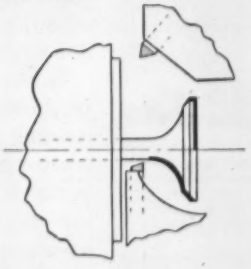
contours valves by direct cam action (no levers)



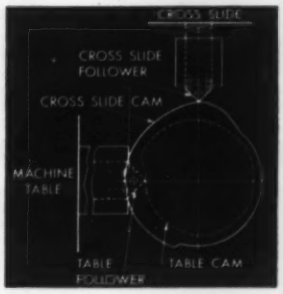
Ex-Cell-O's new Style 312 Precision Boring Machine operates with direct cam action—is fast, accurate, automatic—is solid and rugged to handle tough jobs of precision contouring, boring, turning, facing, and grooving. For full information contact your Ex-Cell-O representative or write Ex-Cell-O in Detroit.

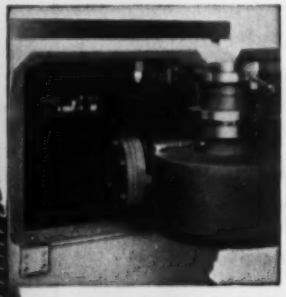
NEW EX-CELL-O CAM BORING MACHINE, Style 312, equipped with two spindles and tooling for operations on valve heads.

VALVES ARE CONTOURED, faced, turned, and taper-turned. This drawing shows the two tools used in each station. The paths they follow on the workpiece are indicated in heavy lines.

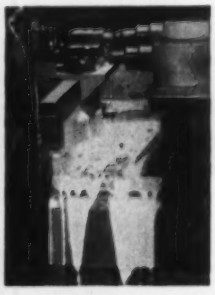


CONTOURING ACTION: Cams act directly on the slide—NO LEVERS. Separate cams for table and for cross slide are both on one shaft, giving exact co-ordination.





CAMS CHANGED IN MINUTES: Cam assembly swings out for quick change of operation. All motors are outside the base.



CHIPS, COOLANT CANNOT ENTER THE BASE. Large chip chute is cast integral with the solid top of the heavy nickel iron base.

XLO
EX-CELL-O for PRECISION

55-1

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DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

STEEL
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CARBORUNDUM®

behind the scenes

Looking Ahead

A man named Bouche-Leclerq once wrote a book which he called *"Histoire de la Divination dans L'Antiquite,"* on account of he was French, and it always came easier to him to write in French than in English. His stubborness in this respect limited the circulation of his book, which was already hampered by the weight of the text.

But divination in America! Ah, that's a different story. Perhaps no nation on earth has ever been more interested in divining the future than the U. S. And in all this broad land no class of people has been more interested in forecasting than businessmen. STEEL takes pride in having discovered an interesting fact. The nonprofessional forecasters among businessmen are often more accurate than professionals.

So, for the past several years, STEEL has been sampling the divining abilities of some 7500 nonprofessional forecasters. The results have proved fantastically correct. The recessions of 1949 and 1954 were hit on the button. Last year, our forecasters were enthusiastic and accurate about 1955's prospects.

The 7500 are being polled again, and a composite of their thinking will appear in STEEL's Metalworking Yearbook (scheduled to hit your desk early the first week in January). If Bouche-Leclerq were to write a second histoire, this time on nonprofessional business diviners, he might have said:

"The divinations encountered in the metalworking book of the year give one furiously to think. Regard, this so formidable business oracle at the stroke of an eye informs of the sales volume, of the manufacturing capacity, of the employment, of the costs in the year next! Tiens! With the fountain pen of one's aunt one may copy the predictions and divinations of the metalworking book of the year of STEEL, and in due time one might astonish one's self by comparing these so resolute facts and figures."

That's a corny way of putting it, but, really, metalworking management's expectations are so carefully reported in STEEL's Yearbook that they serve as a guide to industry all year. Remind us some time to tell you how the editors and statisticians process their statistics. That's a story in itself.

Advance Wrapping

The Yearbook, by the way, has been in the works for some time. The wrappers for it were ordered in July and arrived in October. Right now 40,000 wrappers have been printed, and they are stacked up in the mailing department. You might be inclined to think paper is light, but that wrapper stock weighed 1920 lb. It comes from the Kraft mill of the International Paper Co., Mobile, Ala.

This brown Kraft paper has been in tremendous demand for many years, and even if you get your order in early, there's always a possibility that the government can step in at any time and grab off all the paper in sight. We don't know why Uncle Sam is so crazy about brown wrapping paper, but he is, and if you didn't know it before, may we remind you that we didn't either.

Boon to Bones

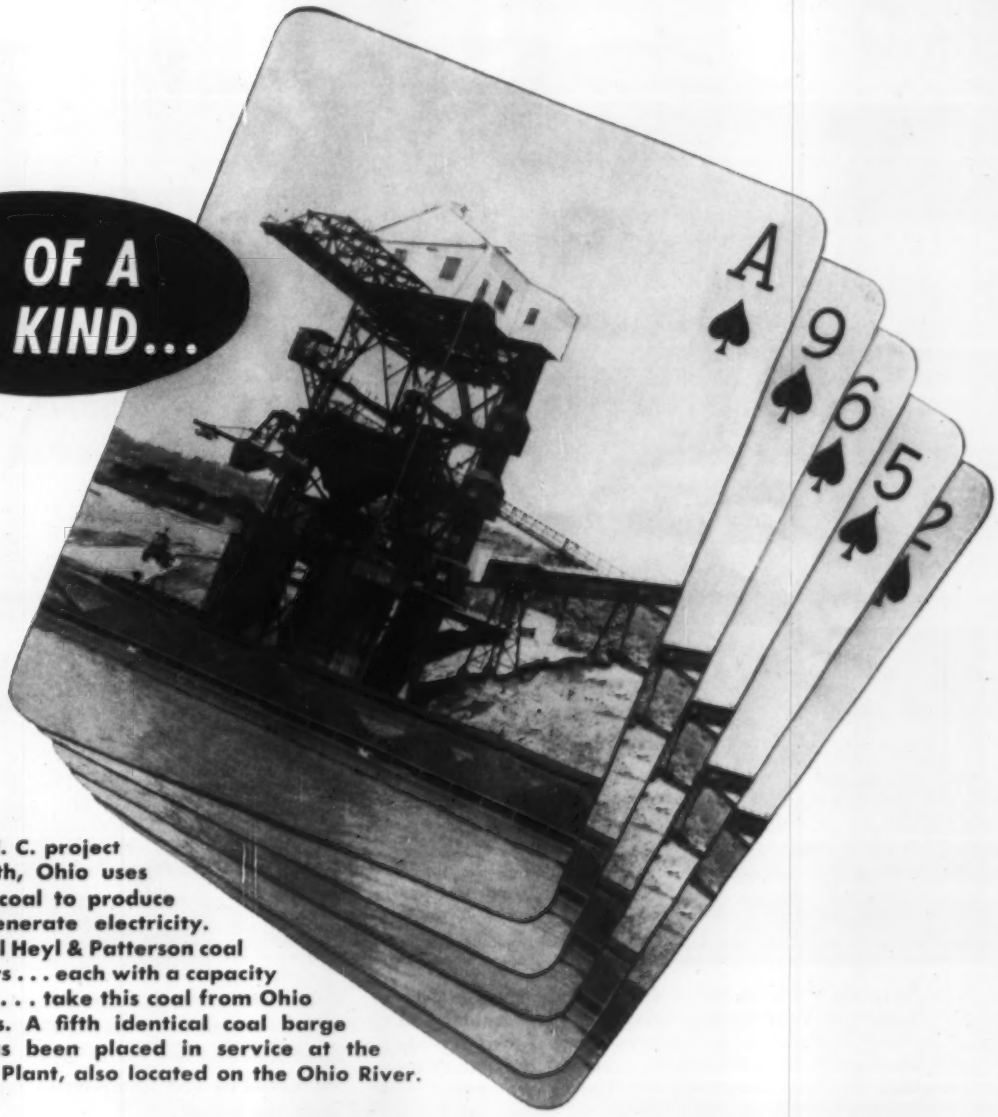
"Arizona Progress," a house organ prepared, published and distributed monthly by the Valley National Bank in Phoenix, Ariz., exhibits a waggish sense of humor for a banking institution. The November issue carried a letter to the editor from a "Pox Vobiscum Service Co. Inc.," calling attention to its new and useful service. "We now write obituaries for a flat fee of $100 each, and we cordially solicit your business. Please call us at your earliest convenience and arrange for a sitting while you are still able to sit," dryly whispered the opening paragraph.

The first notion that occurs to us is that this is really ghost writing at its peak.

Shrdlu

(Metalworking Outlook—Page 49)

5 OF A KIND...



The new A. E. C. project in Portsmouth, Ohio uses river borne coal to produce steam to generate electricity. Four identical Heyl & Patterson coal barge loaders . . . each with a capacity of 1200 TPH . . . take this coal from Ohio River barges. A fifth identical coal barge unloader has been placed in service at the Philip Sporn Plant, also located on the Ohio River.

These 5 Unloaders (2 were built for the Ohio Valley Electric Corp., 2 for the Indiana-Kentucky Electric Corp. and 1 for the Sporn Plant which is owned jointly by Ohio Power Co. and Appalachian Electric Power Co.) carry such standard H & P features as one man operation, automatic cable oilers, built-in service hoists and continuous reeving from large spools of cable.

Continuous reeving which saves many, many feet of valuable wire rope and precious man-hours, was an H & P "First."

Optional H & P features on these 5 Unloaders include an enclosed manlift, space for storage and repair of spare bucket and a motor generator set for adjustable voltage control of hoist and trolley motions.

For more than fifty years Heyl & Patterson has been building Unloaders of various types and sizes for the handling of coal, ore, bauxite, sand, gravel, slag and other bulk materials from barges or ships. *When you have an unloading problem, phone or write for a Heyl & Patterson Engineer to consult with you.*

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- **Boat Loaders and Unloaders**
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- **Thorsten Coal Samplers**
- **Coal Storage Bridges**
- **Rotary Car Dumpers**
- **Bradford Breakers**
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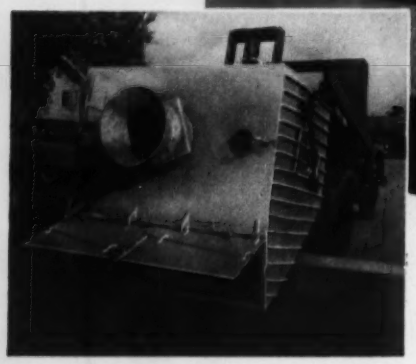
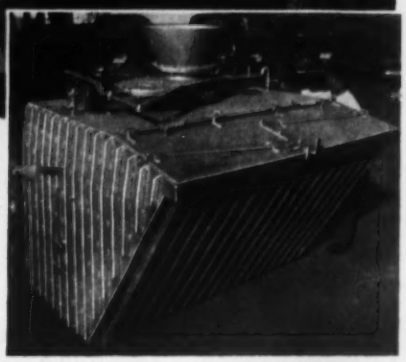
These save

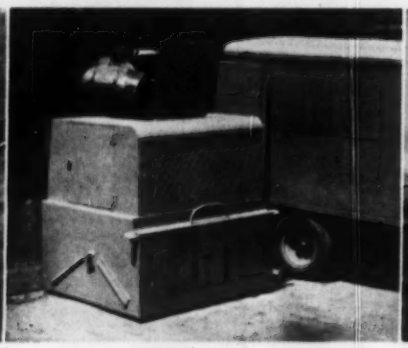




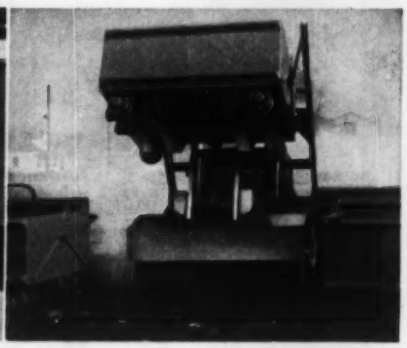
Dempster-Dumpster serving a 6 cu. yd. container with cooling fins for handling a high temperature product.

Here are a few of the hundreds of Detachable Containers we have built to solve handling problems of every description. A few others not shown include those with compartments . . . with insert containers . . . fully-insulated . . . lined with lead . . . lined with fire brick . . . with windows and doors . . . with casters . . . flat bottoms and open at one end . . . with teeth . . . with shelves for tools and supplies—and we could describe hundreds more, all served by one Dempster-Dumpster and only one man, the driver.

This 3 cu. yd. Container has skids for fork lift truck transfer.



10 cu. yd. Container widely used for refuse and combustible wastes.



Flanged wheel equipped containers for remote loading.

5176

DEMPSTER

4 manufacturers to $82,000.00 annually handling waste materials!

These four industrial plants expect to save, in labor costs alone, during the first five years service of the Dempster-Dumpster System—

A PLASTICS PLANT: $26,958.00 savings on an investment of $9,523.50 in Dempster-Dumpster equipment. Savings alone pay for equipment in two years.

A CHEMICAL PLANT: $204,076.75 savings on an investment of $40,968.00 in this equipment . . . savings pay for equipment in one year.

AN AUTOMOTIVE PLANT: $135,000.00 savings on an investment of $19,272.00 . . . savings pay for equipment in 9 months.

A PAPER AND PULP MILL: $43,104.00 savings on an investment of $10,750.00 . . . savings pay for equipment in 1¼ years.

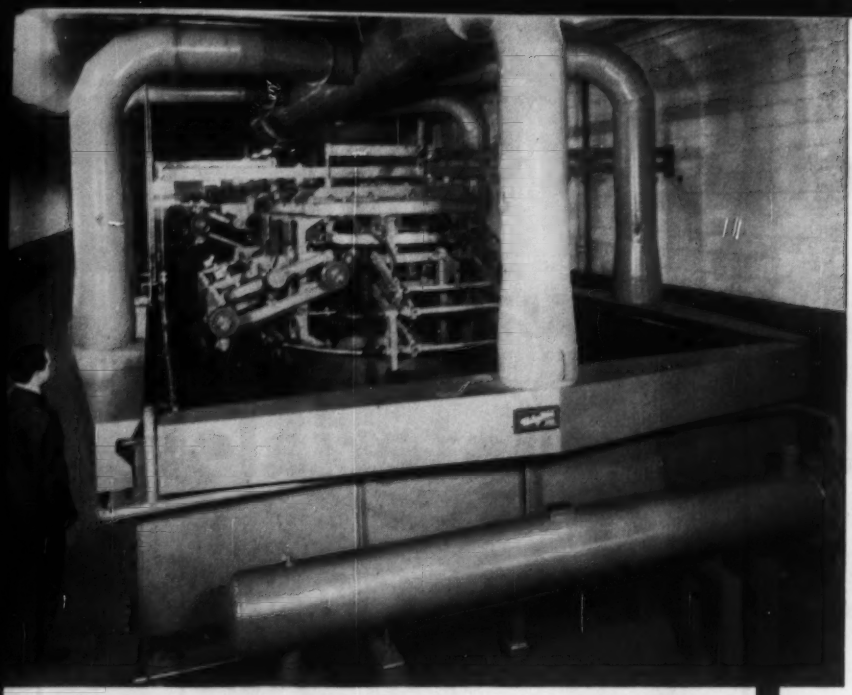
Those are typical examples. Visualize a Dempster-Dumpster, operated by only one man, the driver, serving scores of big steel containers, one after another, in your plant. Containers of many designs and types, handling waste or salvable materials, raw or finished products, fluids including acids, combustibles, dusty materials—anything that can be handled in up to 21 cu. yd. detachable Dempster-Dumpster Containers . . . payloads up to 19 tons. Savings are tremendous! Take advantage of our free engineering service, which determines by fact-finding survey the cost cutting possibilities of this system in your plant. Dempster Brothers, Inc.

600 Gal. stainclad tank with brine cooling channels.

A Container available up to 10 cu. yds. with or without lids for many uses.

A 9 cu. yd. container for handling packaged products.

BROTHERS **6115 Dempster Bldg., Knoxville 17, Tenn.**



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Udylite Automatic Barrel Proves Its Flexibility and High Capacity in Actual Production

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Now in production plating, this new machine incorporates Udylite's years of experience as a foremost horizontal barrel producer plus Udylite's fully automatic engineering genius.

Special features include delayed set downs and skip transfers with complete operational control by the operator. Each cylinder can be raised or lowered independently of the rest. Electrical controls pre-determine desired number of cylinders per hour and time of cylinders in each bath. Speeds can be reduced in the post plate cycle. These and other features mean unheard of operational flexibility.

Get more facts about this new Udylite automatic barrel plating machine. Write for literature today or contact your local Udylite representative.

WORLD'S LARGEST PLATING SUPPLIER

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DETROIT 11, MICHIGAN

LETTERS TO THE EDITORS

Article Put to Use

We think the Program for Management article, "Value Analysis" (Sept. 19, page 101), contains considerable information valuable to key men in any organization. The article was well written and gives concrete examples where cost reduction is possible.

We hold management meetings once a month, and the reprints we requested previously were handed to each department head and to key supervisors. A definite program was worked up whereby specific suggestions on over-all cost reduction are being sought.

Would it be possible to secure 20 additional reprints?

C. S. Beattie
Vice President-General Manager
Delta-Star Electric Division
H. K. Porter Company Inc.
Chicago

Safety Belts and Fox Tails

Most of the efforts described in the Mirrors of Motordom column of Sept. 19, "Detroit Starts Safety Race" (page 75), seem in the Boy Scout stage, like the so-called safety belt. This is about as useful and as effective as the fox tail tied to the auto radio aerial.

The safety belt idea is ridiculous. At impact, the body—from the belt down—needs no $75 safety belt. That part of the body by natural instinct is restrained from going forward. What really does go forward at impact is the head. The belt would be safer and more effective if it were secured to the head or neck, not the waist (and especially around the inventor's neck where it belongs).

You mention that Detroit is interested if you've got ideas on safety. This is the biggest falsehood I ever heard, and I challenge it. I have several inventions that are really worthy. One is a pneumatic rubber auto bumper that reduces damages to a minimum, but the Boy Scouts in auto engineering don't want it.

W. W. Hart
Private Research Laboratory
6 Havens St.
Cumberland, R. I.

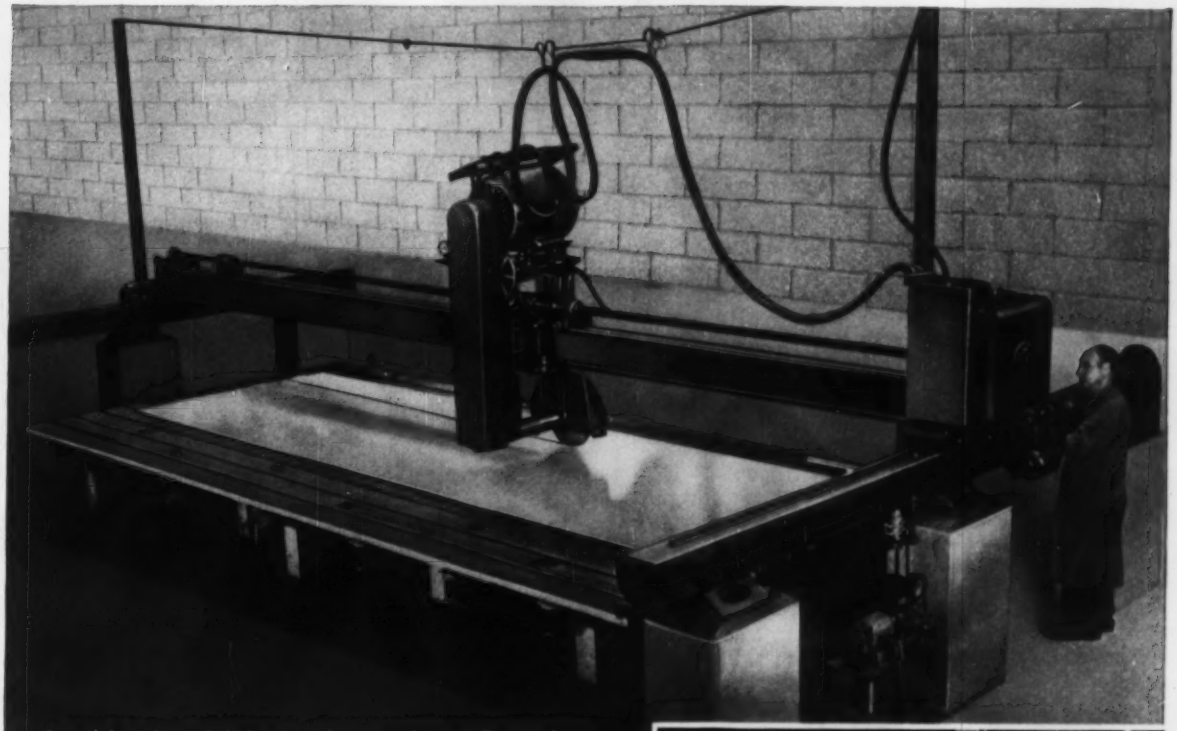
Salesmen To Read Editorial

I noticed in the Letters to the Editors column of Sept. 19 (page 10) that a number of people were enthusiastic over an article, "What Cost Price Fighting?" (July 25, page 41). I did not see this article, but if a reprint is still available, please let me have it.

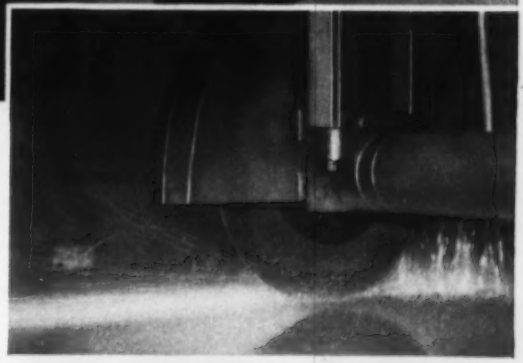
It has been my practice to read the

(Please turn to page 12)

FRASSE INSTALLS HUGE ABRASIVE PLATE SAW...



Large plates (up to 240" long) can be cut on this new Frasse abrasive saw. This means fewer welds . . . lower labor costs . . . and a more saleable product.



This huge new abrasive saw . . . a giant in performance as well as size . . . enables Frasse to cut stainless steel and aluminum plates "to-order" from standard stock sizes. With it, plates up to 240" long can be cut—close tolerances can be kept — and square, smooth edges, suitable for most applications without further finishing, can be obtained.

To the fabricator, this means plate deliveries need no longer bottleneck production . . . inventories can be reduced . . . and edge finishing costs may be cut or wiped out completely, simply by phoning Frasse.

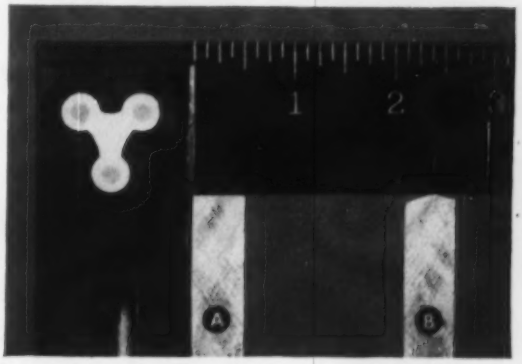
So, for dependable service, quick delivery . . . and a product that can contribute to your profit — depend on Frasse. A *choice* source for your stainless steel and aluminum requirements.

Call FRASSE 1st

For STAINLESS STEEL and ALUMINUM PLATES

Peter A. FRASSE and Co., Inc.

17 Grand Street • New York 13, New York • WAlker 5-2200
PHILADELPHIA • BUFFALO • SYRACUSE • HARTFORD
LYNDHURST • ROCHESTER • BALTIMORE



Abrasive cutting offers a superior edge that will in most cases reduce edge finishing costs. Note (a) cut on the new Frasse abrasive saw, (b) cut on a conventional shear.

Jet airpower is the backbone of America's defense, and jet engines depend upon scientifically exact turbine vanes, turbine blades and supercharger buckets for power and performance.

To mass-manufacture these vital precision parts, Austenal applies the ancient "lost wax" method of investment casting, greatly improved and now called Microcast – a technique so precise and so accurate that Austenal turbine buckets and vanes eliminate costly machining and require only a minimum of finishing.

The Microcast process was developed by Austenal, and its use in the manufacture of vital jet components is only one of many applications. In every field of industry, Microcast is proving that complex, intricate metallic parts can be made better and more economically by investment casting.

Let Austenal show you how Microcast can help brighten your production picture.

See Austenal's original informative 16mm color movie, "A Story of Industrial Progress". Available without charge.

austenal

LABORATORIES, INC.

microcast division

224 EAST 39th STREET · NEW YORK 16, N. Y.

LETTERS

(Concluded from page 10)

magazines which come into our office and to bring to the attention of management, anything which merits their time. I read your editorial of Nov. 14, "Why Cut Prices?" (page 57), and brought it to the attention of our chairman. Our salesmen have been asked to read it.

Carl Siftar
Staff Assistant
Moorlane Co.
Tulsa, Okla.

Re-Equip Method Lauded

Please send us a supply of the worksheets on the simplified guide, as published in the article, "When To Re-Equip" (June 20, page 99).

We believe this method to be the best yet devised for comparing the cost of replacing equipment, and we appreciate your forwarding this information to us.

Robert E. Love
President
Grieder Industries Inc.
Bowling Green, O.

Questions on Cost Reduction

Our section is interested in the article, "Saving Dollars in Manufacturing" (Oct. 24, page 104). As you may know, we at GE have our own approach to this problem through value analysis.

Your article referred to the 261 "why" questions used in cost reduction work at Westinghouse Electric Co. and covered the "why" material questions. We would like further information on the Westinghouse method.

F. R. Decker
Engineering
Small Aircraft Engine Dept.
Aircraft Gas Turbine Divisions
General Electric Co.
Everett, Mass.

• *Write: H. C. McDaniel, Manager of Technical Information, Westinghouse Electric Corp., 3 Gateway Center, Pittsburgh 30, Pa.*

Story Boosts Small Firms

Your article, "Keep Your Product Growing" (Nov. 14, page 101), is well-organized and highly readable. It is a fine boost for the services of independent development organizations, such as our firm.

Your splendid article will help to awaken complacent managements to the urgency of the need for continual product development and will encourage them to utilize the outside experienced help that is available.

We would be grateful if you can send three reprints.

Bernard Woodward Jr.
Creative Engineering
Rochester 21, N. Y.

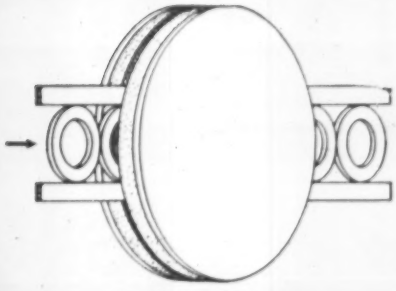
Two grade disc cuts grinding cost

35% more production / longer disc life

WORKPIECE
Cast Iron Rings

FORMER PRODUCTION
Smooth faced discs had to be replaced after grinding 21,500 rings.

PRODUCTION WITH GARDNER 2 GRADE DISCS
raised to 29,000 rings.



GARDNER WIRE-LOKT® Abrasive Discs
30" x 2" x 3½" with corrugated face

INNER GRADE—SOFT for maintaining flat face on discs

OUTER GRADE—HARD for shear cut and to resist "bell mouthing"

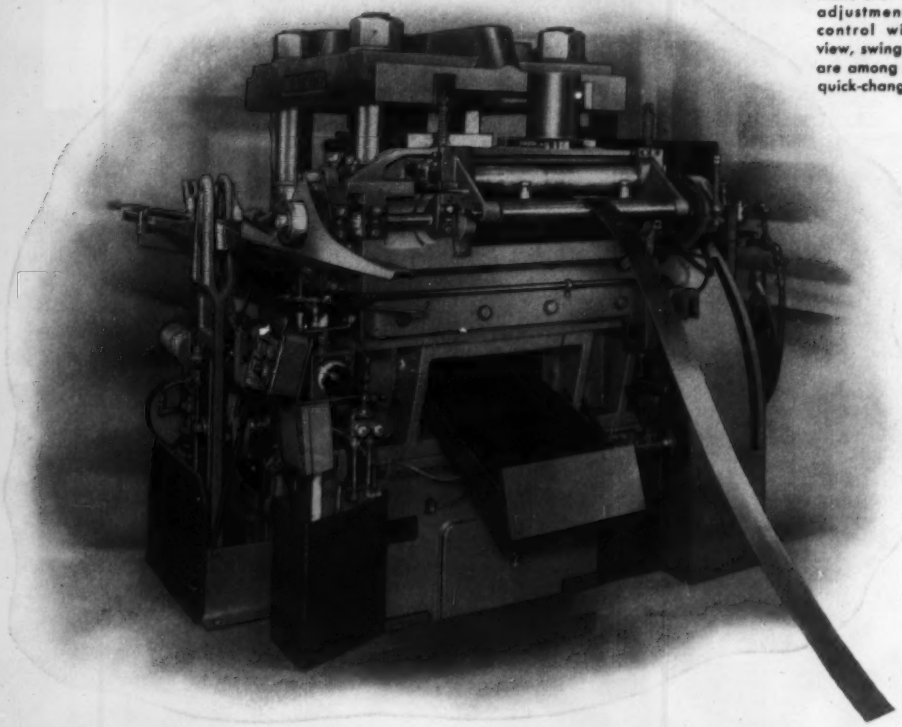
GARDNER

abrasive discs

BELOIT, WISCONSIN

Two to three die changes a day

HENRY & WRIGHTS COMBINE HIGH SPEED OPERATION WITH HIGH SPEED JOB CHANGE



Open construction, easy-to-make shut height and feed adjustments plus inching control with die in full view, swing-away roll feeds are among Henry & Wright quick-change features.

As many as two to three job changes in a day are being made by companies taking advantage of the quick-change features of Henry & Wrights. These companies report sharply reduced costs on short runs. A contract plant said it had greatly improved its competitive cost situation and was re-bidding on jobs previously lost.

Their unique quick-change features are just some of the reasons why Henry & Wrights rate preference in modernization programs. Other advantages are high speed with minimum vibration, precise alignment of punch and die, quick-stop pneumatic clutch, overall rigidity—and the assurance of longer die life.

Only the best is good enough

You owe it to yourself to get the complete story about Henry & Wrights and how they can improve your stamping methods. Our representative will be glad to give you the details.

HENRY & WRIGHT

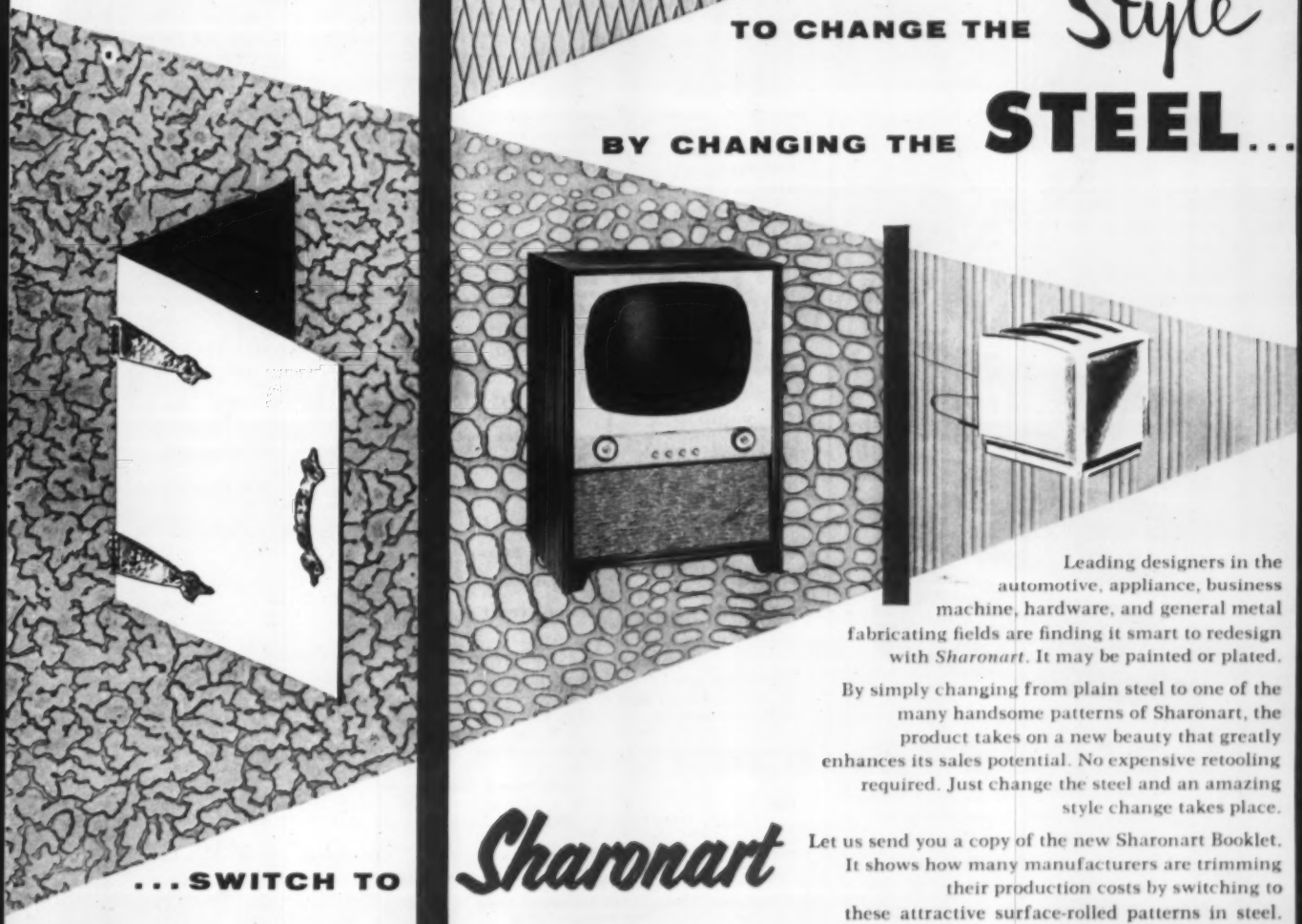
DIVISION OF EMHART MFG. CO.

441 WINDSOR STREET, HARTFORD, CONNECTICUT

it's smart

TO CHANGE THE *Style*

BY CHANGING THE **STEEL**...



...SWITCH TO *Sharonart*

Leading designers in the automotive, appliance, business machine, hardware, and general metal fabricating fields are finding it smart to redesign with *Sharonart*. It may be painted or plated.

By simply changing from plain steel to one of the many handsome patterns of Sharonart, the product takes on a new beauty that greatly enhances its sales potential. No expensive retooling required. Just change the steel and an amazing style change takes place.

Let us send you a copy of the new Sharonart Booklet. It shows how many manufacturers are trimming their production costs by switching to these attractive surface-rolled patterns in steel.

SHARON STEEL CORPORATION
Sharon, Pennsylvania

SHARON STEEL CORPORATION
Sharon, Pennsylvania — S-12125

Please send "SHARONART Surface-Rolled Patterns in Steel" Brochure.

Name.....

Position.....

Company.....

City..... Zone..... State.....

SHARONSTEEL

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3 important reasons you should use STAR "Moly" High Speed Steel Blades

1 They outlast standard steel blades 10 to 1!

2 They assure high speed cutting performance second to none.

3 They are substantially lower in cost than any other type high speed steel blades!

Star was the first to successfully use molybdenum to make "Moly"® High Speed Steel Blades that would be tough, carry the load, retain sharpness and embody all the other high qualities and properties of heavy-duty blades. Order "Moly" High Speed Steel Blades from your Industrial Distributor. Rely on him for *all* your metal-cutting needs. Remember, he carries the complete line of STAR Hand and Power Hacksaws, Metal and Wood Cutting Band Saws and Hacksaw Frames.

FREE Ask your Industrial Distributor for a supply of our NEW Metal Cutting Booklets and Wall Charts.

Sold Only Through Recognized Distributors

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MIDDLETOWN, N. Y., U. S. A.

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And Roebling galvanized wire can be packaged in the way most convenient and economical for you... in coil diameters of 60″, 30″, 22″, 16″ and 8″...on reels, spools or handy spoolless cores.

You *pay* for the best when you buy galvanized wire. Make sure you *get* it—specify Roebling! John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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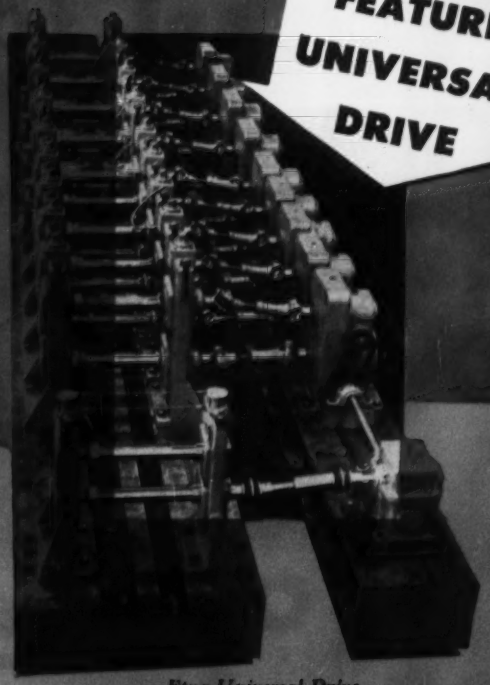
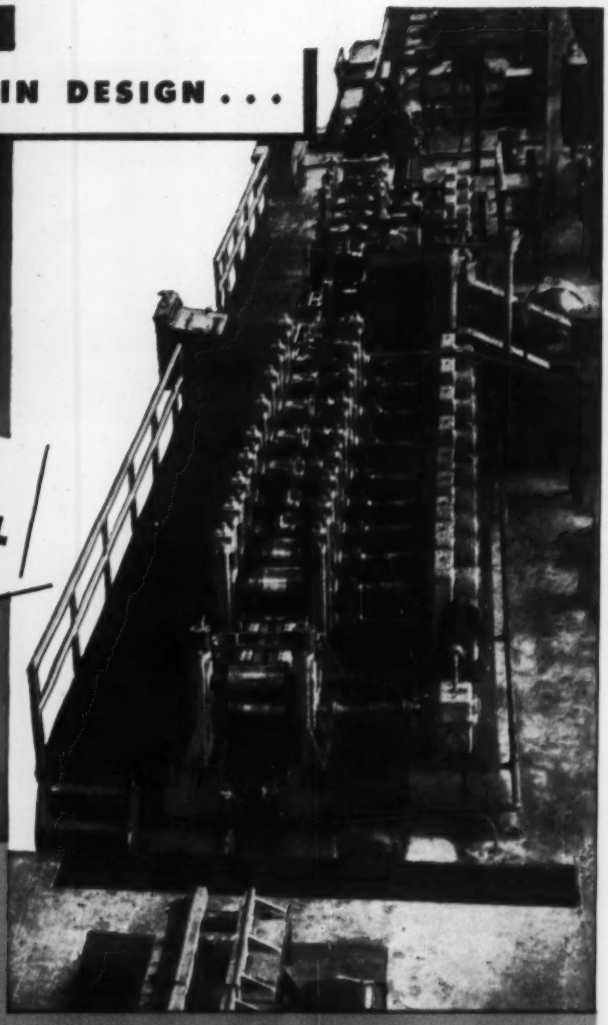
FEATURE UNIVERSAL DRIVE



Etna Universal Drive



You'll notice a trend toward Etna's modern machine design. Etna has sold more Universal Drive Mills than all other manufacturers combined. The Universal Drive provides greater accuracy in the forming of the tube, and allows an easier change from the manufacture of one diameter tube to another.

PERMANENT OIL COOLED TRANSFORMER

For greater efficiency an *Oil Cooled Transformer* is incorporated into the machine. It is a *permanent unit* and *never has to be replaced*. Cooling with oil eliminates the necessity to dry out the transformer after each days work, which is necessary when water is used as a transformer coolant. Etna Mills . . . Built for continuous operation. Write for complete details.

Abbey ETNA Company

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Bremen Bearings, Inc., uses SUPERLA Soluble Oil to give bearings the clean, cool treatment

PRECISION NEEDLE BEARINGS are the exclusive product of Bremen Bearings, Inc., Bremen, Indiana. SUPERLA Soluble Oil is used exclusively in all eight of the Company's Cincinnati Centerless Grinders. Plant management experimented with various soluble oils before settling on SUPERLA. They found none could compare with SUPERLA Soluble Oil with respect to wheel loading, stability and tool machine cleanliness.

Plus these benefits, Bremen found SUPERLA mixed readily with water regardless of degree of hardness. The Company found, too, that they got longer tool life and maximum rust protection of work and machines.

You will have the same experience with SUPERLA Soluble Oil. Find out. Inquire of your Standard Oil lubrication specialist. In the Midwest call your nearby Standard Oil office. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Ill.

STANDARD OIL COMPANY (Indiana)

STANDARD

Franklin D. Clark (right), Sales Manager, Bremen Bearings, Inc., and Standard Oil lubrication specialist E. A. Hunt, inspect needle bearing. Gene Hunt is well qualified to assist industrial plants on lubrication problems. In addition to his three years' experience in industrial lubrication sales work, Gene has an M. E. degree from Purdue and has completed the Standard Oil Sales Engineering School. Customers find this experience and training pay off *for them*.

Bearings being ejected from Cincinnati Centerless Grinder at Bremen Bearings, Inc. The Company manufactures needle bearings to customers' specifications in sizes from 1/16 to 1/2 inch with tolerances of .0001" and finishes to 3 micro-inches. SUPERLA Soluble Oil is used on all of the Company's grinders.

CINCINNATI RIGID SHAPERS

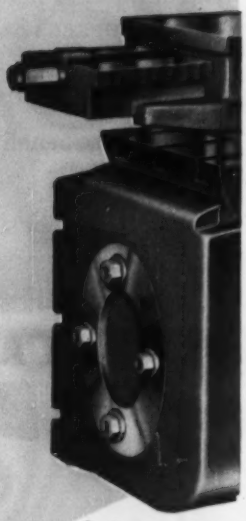
New—modern—these Rigid Shapers offer faster, more convenient controls, greater accuracy, greater dependability. The New nodular iron ram, trunnion and vise, and wide heavily ribbed column give a new rigidity—increase accuracy in cutting.

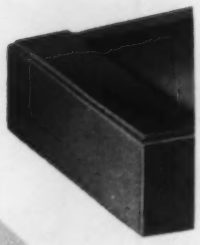
The New slot-free ram also eliminates the manual clamping of ram adjustment—a time saving feature.

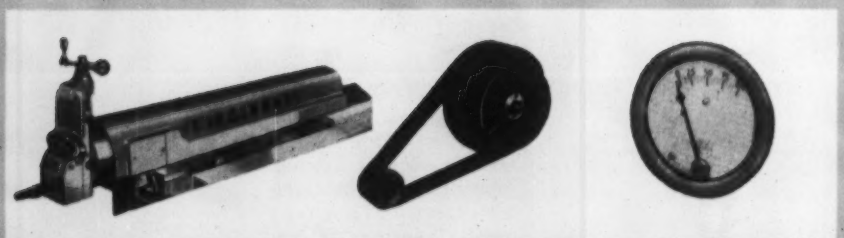
A speedy, dependable electro-magnetic brake and clutch insure a faster performance.

50 P.S.I. pressure lubrication, exclusive on Cincinnati Shapers, is a real insurance against wear and a guarantee of long trouble-free performance.

Write for the circular on the New Rigid Shapers.



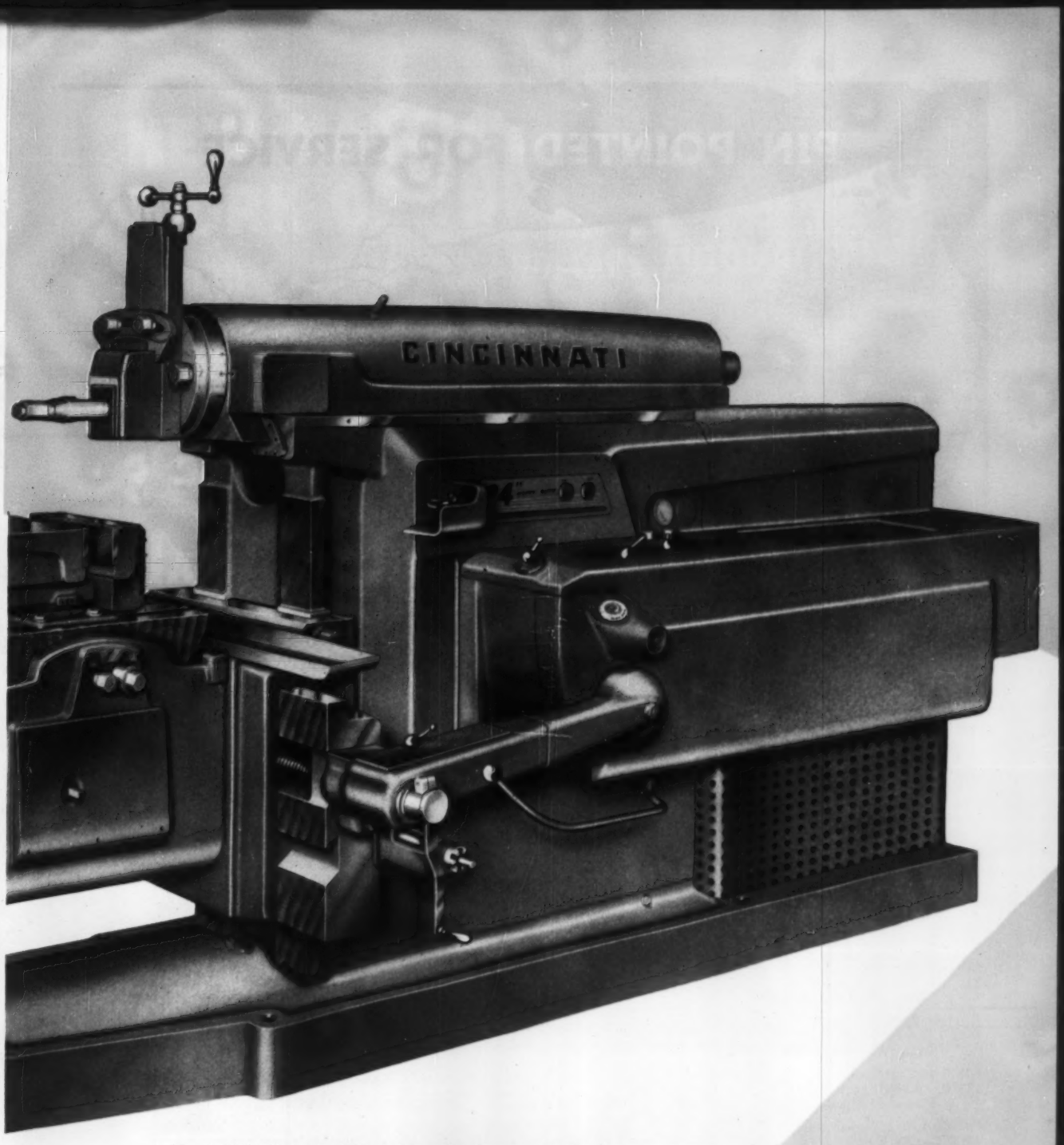




Nodular iron, slot-free ram

Electro-magnetic Clutch and Brake

The only shaper with 50 P.S.I. lubrication



Cincinnati Shapers, Shears and Press Brakes carry a 5 year guarantee on workmanship and material—write for details.

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CINCINNATI

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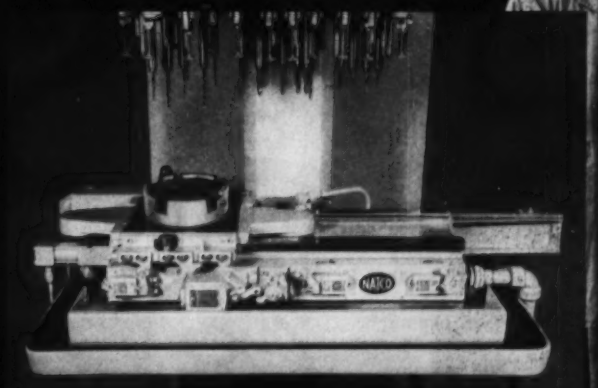
NEW NATCO DRILLER DOES WORK OF THREE MACHINES

...DRILLS, CHAMFERS AND TAPS AUTOMATICALLY!

NATCO H-6 LIGHT SENSITIVE, ADJUSTABLE MULTI-SPINDLE DRILLER AND TAPPER WITH...

3 POSITION AUTOMATIC FIXTURE SLIDE



THREE POSITION AUTOMATIC FIXTURE SLIDE IN DRILL POSITION.

TYPICAL FEED CYCLE

POSITION No. 1—DRILL	POSITION No. 2—CHAMFER	POSITION No. 3—TAP
Load Part	Rapid Traverse	Rapid Traverse
Rapid Traverse	Feed Forward	Feed Forward
Feed Forward	Rapid Reverse	Feed Reverse
Rapid Reverse	Index to Position No. 3	Rapid Reverse
Index to Position No. 2		Index to Position No. 1

NATIONAL AUTOMATIC TOOL COMPANY, INC.
RICHMOND, INDIANA

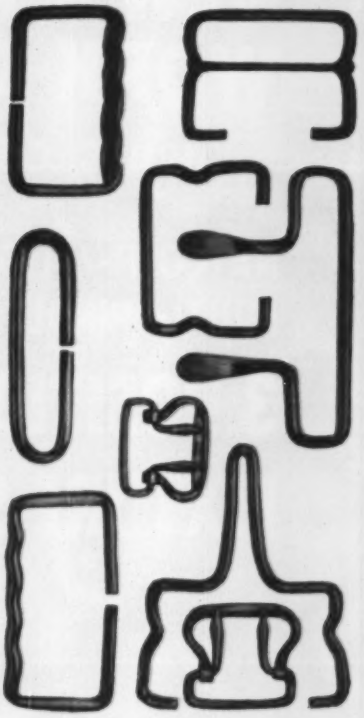
for answers to your Drilling, Boring, Facing and Tapping problems

Call a Natco Field Engineer

CHICAGO, *Room 203, 6429 W. North Ave., Oak Park*
DETROIT, *10138 W. McNichols Rd.*
BUFFALO, *1807 Elmwood Ave.*
NEW YORK, *35 Beechwood Ave., Mount Vernon*

NATCO

Anaconda Wire now available in New Pay-off Container



BUCKLES AND BUCKLE PARTS made by West Haven Buckle Co., West Haven, Conn., using Anaconda 70-30 yellow brass wire. Finished buckles, later nickel plated, are of highest quality, noncorroding, for use in surgical bandages, trusses, corsets and other surgical appliances.

Shutdowns to change coils in wire forming machines cut 90% at West Haven Buckle Company

The West Haven Buckle Company of West Haven, Conn., used to be limited to relatively light coils of brass wire because of the slide feed necessary for free pay-off into its wire forming machines. Machines could operate less than an hour before shutdown to feed in another coil.

When they started using Anaconda Wire packaged in the *new pay-off barrel*, which provides free pay-off, the runs were increased 10 times. The big coils of brass wire—400 to 500 pounds—made possible continuous runs of from 8 to 9 hours. This cut the time lost in changing coils 90 per cent. It eliminated the labor of shifting and lifting heavy coils—as the wire is fed directly from the barrel.

An easy way to increase production, cut costs: Big coils of Anaconda Wire in the *new pay-off barrel* give you these advantages:

1. Reduced down-time to change coils can mean production increases up to 25 per cent. Free pay-off feature may enable you to increase machine speed for still greater production.
2. Operators are freed for other duties during the longer continuous runs.
3. Easier handling, better inventory control. Barrels are clearly marked for quick identification—are easily handled by standard hand trucks—utilize storage space efficiently—can be stacked. Losses are minimized because coils stay clean indefinitely—there is no danger of coils becoming tangled or mixed.

No extra charge for Anaconda Wire in the new pay-off container. Call your American Brass Company representative today or write: The American Brass Company, Waterbury 20, Conn.

5585

THE NEW CONTAINER which provides Anaconda Wire in 400 to 500 pound coils, ready for free pay-off into pin machines and other automatic forming machinery. Anaconda wire in all alloys is available packaged this way for long, continuous runs—in all gages up to .090", in tempers at least one number hard.

ANACONDA®

COPPER AND COPPER ALLOY WIRE

CALENDAR
OF MEETINGS

Dec. 12-13, Material Handling Institute Inc.: Annual meeting, Hotel Statler, New York. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Dec. 12-16, Atomic Exposition and Nuclear Engineering & Science Congress: Public Auditorium, Cleveland. Information: International Atomic Exposition, 931 Book Bldg., Detroit 26, Mich.

Dec. 13-15, Industrial Truck Association: Winter meeting, Hotel Statler, New York. Association's address: Washington Loan & Trust Bldg., Washington 4, D. C. Managing director: William Van C. Brandt.

Jan. 3-6, Institute of Scrap Iron & Steel Inc.: Annual meeting and exhibit, Sherman hotel, Chicago. Institute's address: 1729 H St. N. W., Washington 6, D. C. Executive vice president: E. C. Barringer.

Jan. 9-13, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac hotel and Hotel Statler, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Jan. 11-13, Aluminum Extruders Council: Annual meeting, Saxony hotel, Miami Beach, Fla. Council's address: 209 Washington St., Boston, Mass. Executive secretary: Phillip Lemelman.

Jan. 11-14, American Road Builders' Association: Annual convention and exhibit, Municipal Auditorium, Miami Beach, Fla. Association's address: World Center Bldg., Washington 6, D. C. Executive vice president and secretary: Eugene Reybold.

Jan. 18-19, Caster & Floor Truck Manufacturers Association: Annual meeting, New Weston hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Secretary: Harry P. Dolan.

Jan. 18-19, Steel Shipping Containers Institute Inc.: Winter meeting, Hampshire House, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Jan. 19-20, Steel Plate Fabricators Association: Annual meeting, Palmer House, Chicago. Association's address: 79 W. Monroe St., Chicago 3, Ill. Secretary: J. Dwight Evans.

Jan. 20, Malleable Founders' Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 15, O. Secretary: Lowell D. Ryan.

Jan. 23-24, Industrial Heating Eqiupment Association: Annual meeting, LaSalle hotel, Chicago. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Carl L. Ipsen.

Jan. 23-25, Truck-Trailer Manufacturers Association Inc.: Annual meeting, Edgewater Gulf hotel, Edgewater Park, Miss. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

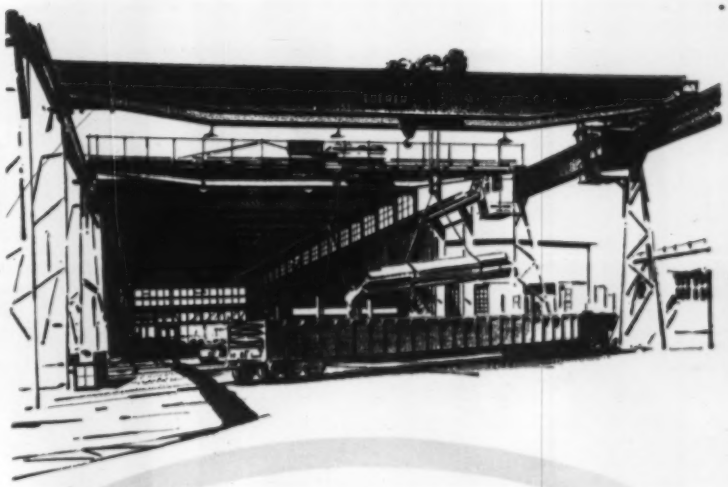
Jan. 23-26, Plant Maintenance & Engineering Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Jan. 24, Cutting Tool Manufacturers Association: Annual meeting, Detroit Yacht Club, Detroit. Association's address: 416 Penobscot Bldg., Detroit 26, Mich. Executive secretary: Martin J. Ewald.

Jan. 24-27, American Management Association: General management conference, Fairmont hotel, San Francisco. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

Jan. 26-27, Blast Furnace & Coke Association of the Chicago District: Winter meeting, Del Prado hotel, Chicago. Information: C. W. Bruce, chief engineer, Republic Steel Corp., 11600 S. Burley Ave., Chicago 17, Ill.

Jan. 28-Feb. 4, Industrial Diamond Association of America Inc.: Annual meeting, Hollywood Beach hotel, Hollywood Beach, Fla. Association's address: Box 175, Pompton Plains, N. J. Executive manager: Athos D. Leveridge.



Steel Fabricating Calls for a Versatile Crane

Such details as an auxiliary hoist, which operates more rapidly and with less power consumption than the main hoist, fits the exact job requirements for a crane in a steel fabricating plant. Here's where a great variety of loads both light and full crane capacity are being handled all the time. EDERER takes every such special job requirement into consideration when "job-engineering" a crane.

No matter what YOUR requirements—no matter what YOUR industry—EDERER can "job-engineer" a crane to do the job for you. This will assure you capacity performance—minimum maintenance—lower cost-per-ton materials handling.

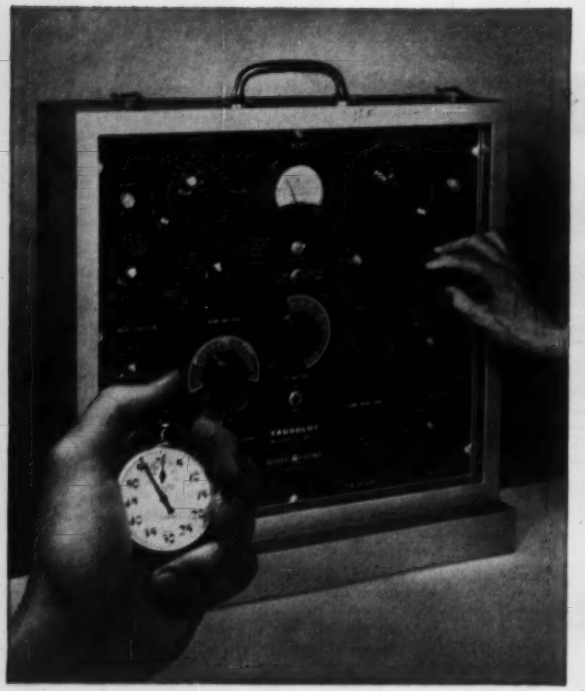
EDERER industrial crane catalog, Bulletin CR-610, will give you details . . . write for it.

281C55

EDERER ENGINEERING COMPANY
2935 First Avenue South
Seattle 4, Washington
EXPORT DIVISION:
301 Clay Street, San Francisco 11, California

EDERER
CRANES

OVER 53 YEARS "JOB-ENGINEERING" CRANES FOR INDUSTRY



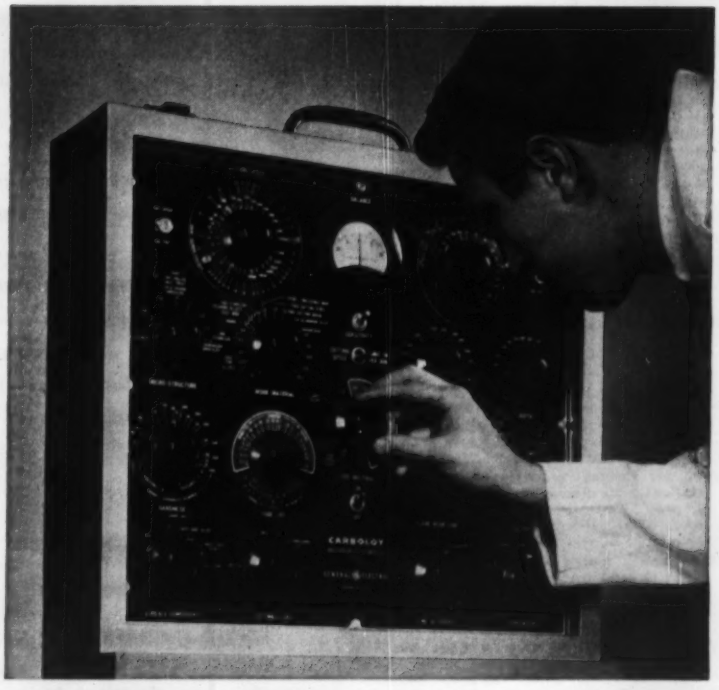
SOLVE MACHINING PROBLEMS IN SECONDS

The Carboloy Machinability Computer can determine the most efficient values for any of these 19 basic operating variables:

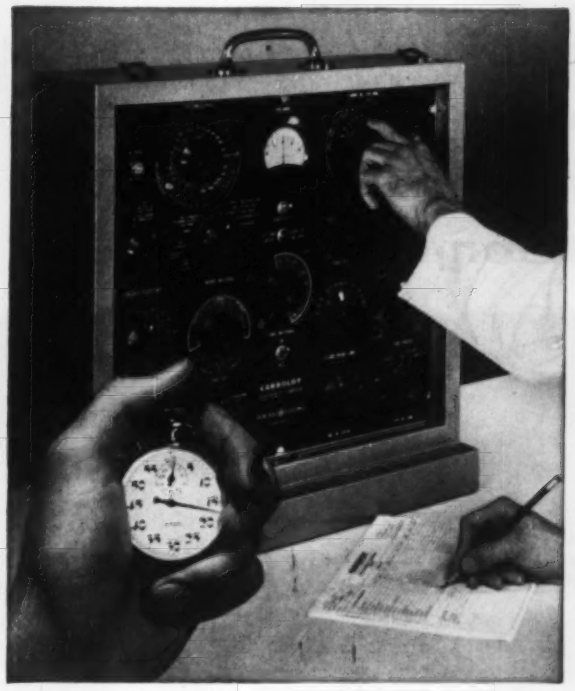
Material to be cut: Work material, microstructure, hardness, surface condition.

Cutting tool: Tool material, tool life, flank wear land, tool profile, type of tool, number of teeth.

Cutting conditions: Cutting fluids, feed, depth of cut, cutting speed, motor horsepower, cubic inches per minute, unit horsepower, work diameter, R.P.M.



CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY



Set dials for the values of each of the known variables. (Time: 1 – 2 minutes.)

Turn dial of unknown variable until meter balances at zero setting. (Time: 10 – 15 secs.)

Read the answer directly off the dial. No computations are necessary. (Time: 10 secs.)

WITH CARBOLOY MACHINABILITY COMPUTER

- **Calculate production, tool life, horsepower, or any of 16 other basic machining variables**
- **Eliminate wasteful tryout runs, improve existing setups**

The Carboloy Machinability Computer is a new engineering tool designed to solve complex machine setup problems in seconds, instead of hours.

It calculates the effect of the 19 most critical machining variables on the material to be cut, the cutting tool, and the cutting conditions . . . shows how to set up optimum operating conditions for any metal-cutting job, and how to improve existing setups by the right variation of operating conditions.

For production men, methods men, etc.

The Computer assists production men by determining rate of metal removal, and by immediately showing how production is affected by changes in feed, speed, depth of cut, tool material, and other key variables.

The Computer eliminates wasteful, nonproductive trial runs, saving valuable stock and setup time. It also determines machine output for methods men, pieces per hour for estimators, and it answers other problems pertaining to machining . . . providing accurate solutions in seconds for problems that normally take hours for even approximate answers.

Easy to use

The Carboloy Machinability Computer is easy to operate. Anyone with machining experience can use it after a short familiarization period.

The computer is portable (weighs only 32 lbs.), battery-operated, and measures 21″ x 7″ x 20″. The price of the computer is $495, f.o.b. factory, Detroit.

Whether your plant is large or small, the Carboloy Machinability Computer can pay for itself by increasing production, reducing manpower costs. For full details, or to arrange a demonstration at your plant, send coupon today.

CARBOLOY
Department of General Electric Company
11141 E. 8 Mile Street, Detroit 32, Michigan

☐ Send me information on the Carboloy Machinability Computer.

☐ Have a representative call to demonstrate the Computer.

Name_____

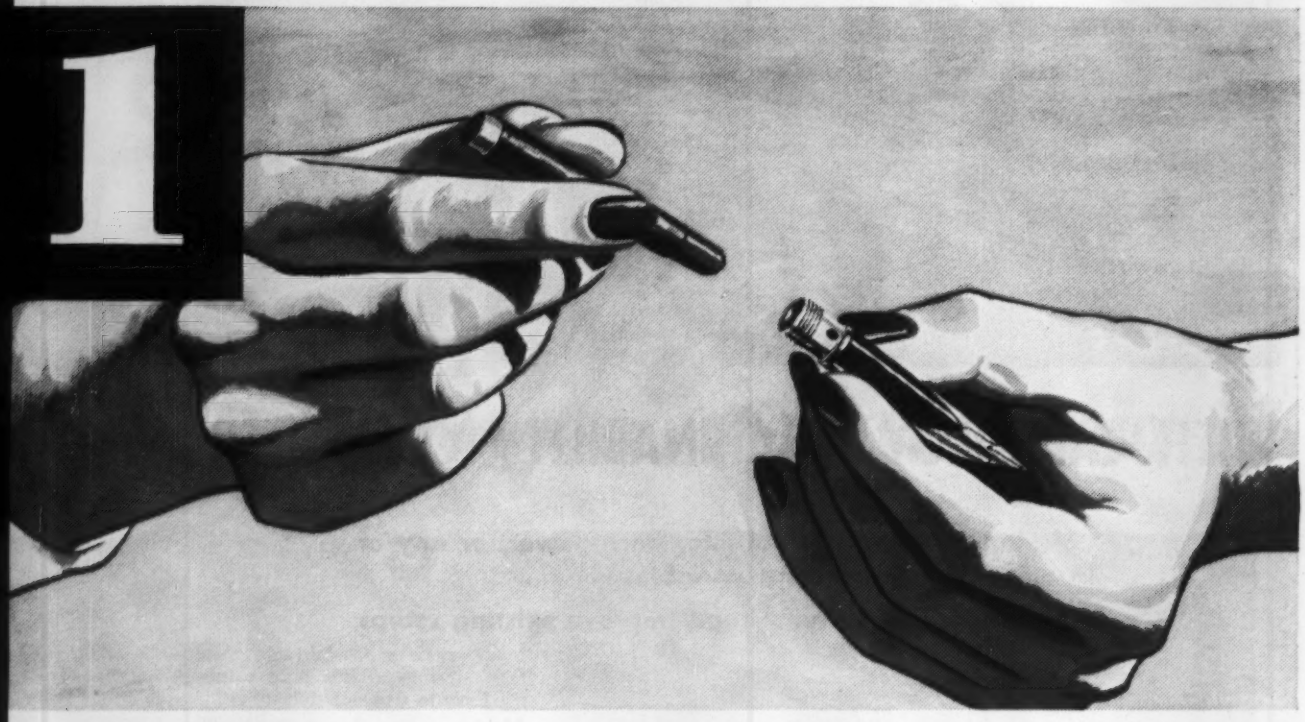
Title_____

Company_____

City_____ Zone____ State_____

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

This company made a better product with the help of Alcoa's Development Division



Waterman Pen Company makes a better fountain pen

Engineers of the Waterman Pen Company decided to banish the ink bottle. An ink-filled cartridge seemed to be the way around old-fashioned "fill-and-spill" methods. Their designs called for a polyethylene capsule, filled with liquid ink and capped at one end. Question was, how to cap the end. Many suppliers were consulted—most said it couldn't be done. Then an Alcoa sales engineer suggested an aluminum cap.

Specialists at Alcoa's Richmond, Indiana, closure division designed a 6-mm aluminum cap with a polyethylene liner. The plan was to heat-seal the strong, corrosion-resistant aluminum cap to the polyethylene cartridge at the time of filling. Alcoa engineers then worked with the packaging machinery manufacturer to develop a way to fill, cap and heat-seal the cartridge in one operation. The result you can see in any fine store today. The new Waterman C/F pen can be filled in seconds without fuss or muss.

Experience gained from thousands of such projects is available to you through Alcoa's Development Division. Making your *product* perform better in aluminum could be our *next* job.

DEVELOPMENT DIVISION
ALUMINUM COMPANY OF AMERICA

This company gets strong marketing support with the help of Alcoa's Labeling Program

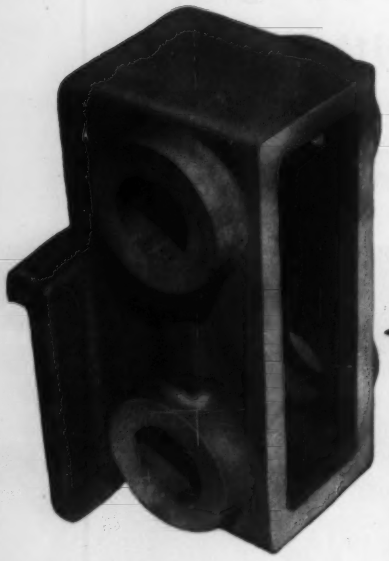
Grumman adopts the Alcoa label

Signing the Alcoa Labeling Agreement enabled Grumman to use the powerful Alcoa label with the famous Grumman name. The combination tells distributors, dealers, and customers that here is a product with an aluminum pedigree. Thus Grumman shares in the millions of impressions of the Alcoa label that will appear in national magazines and on television in 1955.

The accumulated recognition of the Alcoa name, which for 67 years has stood for the finest in aluminum, is available to Alcoa mill product customers with their use of the Alcoa label. Complete plans and detailed advantages of its use are available from your local Alcoa sales engineer. The Alcoa office nearest you is listed under "Aluminum" in your classified phone book.

Your Guide to Aluminum Value

Case History No. 31 CHAIN BOX

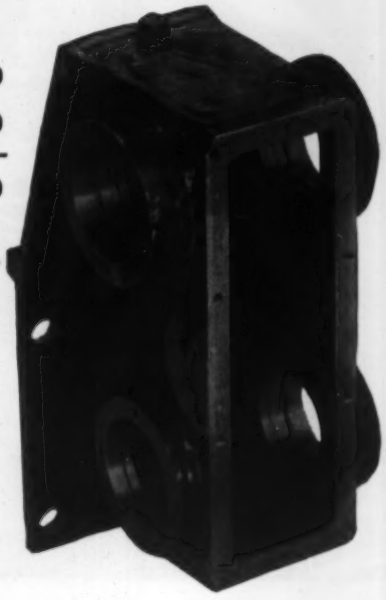


GRAY IRON CASTING

initial cost	$ 9.22
machining	$12.50
TOTAL COST	$21.72

WELDMENT

initial cost	$21.00
machining	$23.50
TOTAL COST	$44.50



GRAY IRON SAVES OVER 50%

The cost of this Chain Box was cut more than half by switching to one, uniform-strength Gray Iron casting. And there are no more welded seams of varying quality to worry about! An important fact, since this chain box is used on rugged road-building equipment. Pattern costs were quickly amortized.

It will pay *you* to look for new, cost-saving ways to use Gray Iron . . . and at the same time obtain the other unique advantages inherent in modern Gray Iron castings. Gray Iron is durable . . . rigid . . . absorbs vibration . . . is heat and corrosion resistant . . . has low notch sensitivity and a wide strength range. It is truly the proved metal that meets modern design needs better and more economically.

For specific technical and business information, write direct to Gray Iron Founders' Society, Inc., National City—East 6th Building, Cleveland 14, Ohio.

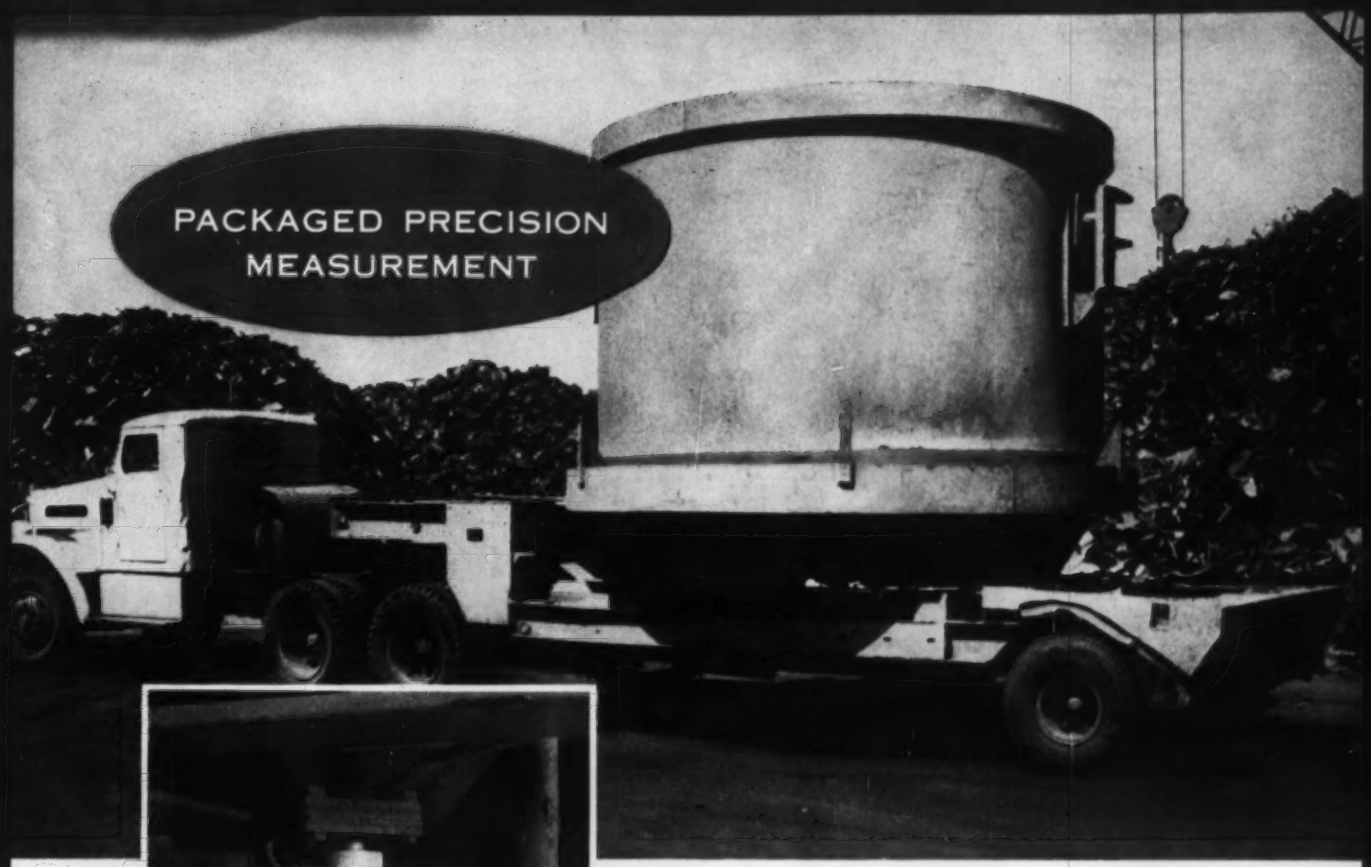
This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

MAKE IT BETTER WITH GRAY IRON

GRAY IRON FOUNDERS' SOCIETY



SR-4® Load Cells cut handling time by weighing scrap anywhere in yard

Baldwin's "Packaged Precision Measurement" can help you lower the cost of handling all heavy materials.

That's being demonstrated in this scrap steel yard of a large steel mill. Baldwin's SR-4 Load Cells, installed under loading buckets, have reduced greatly the time required to load the scrap steel and move the buckets on to electric furnaces.

Here's how. Each truck is fitted with four SR-4 Load Cells supporting the scrap hopper (see smaller photo). Continuous, accurate weight is provided by a Baldwin Type 5 Precision Indicator mounted on the trailer in a steel housing, powered by batteries through an inverter.

This system is much more flexible than the previous method. The previous one had wasted a lot of time because it was necessary to move the scrap load to a scale car on tracks that could only move back and forth under an overhead crane.

Thanks to Baldwin's "Packaged Precision Measurement," scrap charge load weights (upwards of 50 tons each now) are checked instantly on the indicator during loading operations *anywhere in the yard.* The exact amount of scrap needed is in the bucket when it leaves the scrap yard.

SR-4 devices are ruggedly built to withstand severe impacts and overloads. Their exceptionally high accuracy does not change with age. There are no moving parts to wear out. There's no hydraulic system to control. For detailed information about SR-4 device applications and instrumentation, write us or use the coupon right away.

BALDWIN · BLH · LIMA-HAMILTON

Eddystone Division

BALDWIN-LIMA-HAMILTON

Dept. 3446, Baldwin-Lima-Hamilton Corporation
Philadelphia 42, Pa.
(In Canada: Peacock Bros., Ltd., Montreal, Quebec)
Please send me the following new literature:

- ☐ Bulletin 4300 (Introduction to SR-4 Devices)
- ☐ Bulletin 4301 (SR-4 Load Cells and Load Beams)
- ☐ Bulletin 4304 (SR-4 Crane Scales)
- ☐ Bulletin 4302 (SR-4 Weighing of Tanks, Bins, Hoppers)

Name _____ Title _____

Company _____

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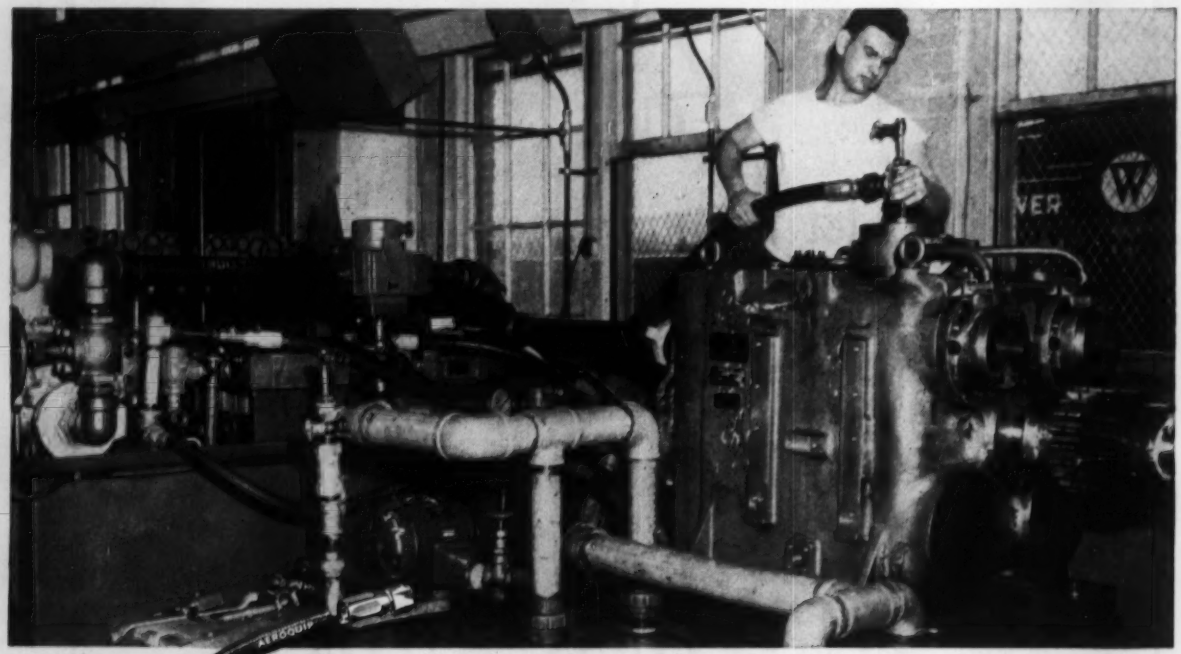
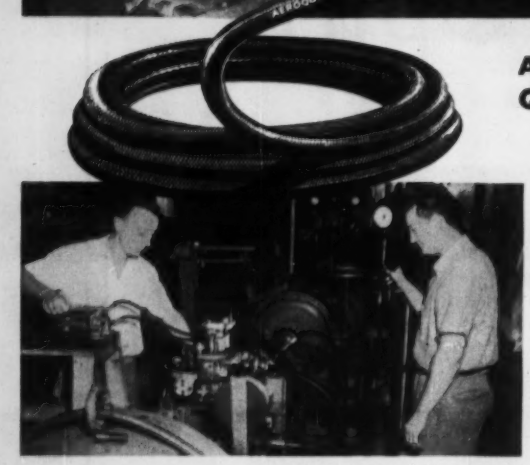
City _____ Zone _____ State _____

This year...
let us open our hearts
and homes to the
Brightest Gift of All...
The True Spirit
of
CHRISTMAS
MORSE TWIST DRILL & MACHINE COMPANY · NEW BEDFORD, MASSACHUSETTS

"Our Test Stand Hook-Up Time Has Been Reduced From Days To Hours"

SAYS HENRY LEGERE, *Hydraulic Test Foreman, Waterbury Tool Division of Vickers Incorporated*





Size 5 heavy duty transmission for cargo winch drive shown in a typical test stand hook-up. Notice how Aeroquip flexible hose lines are used to eliminate need for alignment.

AEROQUIP FLEXIBLE HOSE LINES INSTALL QUICKLY...ELIMINATE ALIGNMENT PROBLEMS

Pressures as high as 5,000 p.s.i. are encountered in the testing of hydraulic equipment produced by Waterbury Tool Division of Vickers Incorporated, Waterbury, Conn. Aeroquip hose lines meet all performance requirements, and make it possible for laboratory personnel to make test stand installations quickly and easily.

Henry Legere, Test Stand Foreman, reports that one installation, normally requiring four hours to form and fit piping, is accomplished in *5 minutes* when Aeroquip hose lines are used!

A supply of Aeroquip bulk hose and reusable fittings will help you three ways: (1) Cut inventory because you can make Aeroquip hose lines to required length in minutes; (2) Cut installation time because all alignment problems are eliminated; (3) Eliminate failures because Aeroquip hose lines are exceptionally tough and durable.

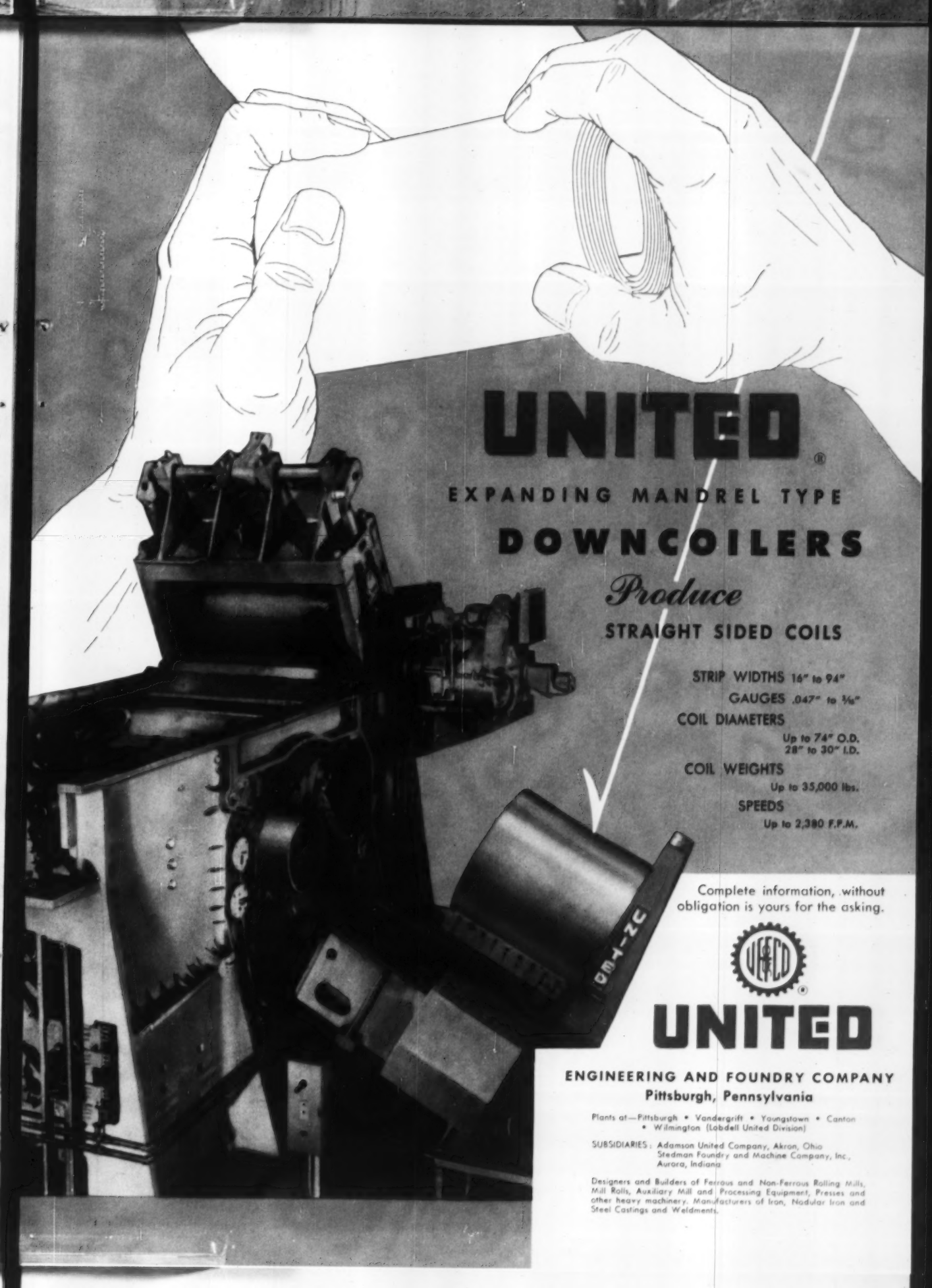
Write for complete information.

Aeroquip

REG TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U.S.A. AND ABROAD • AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD



UNITED®

EXPANDING MANDREL TYPE

DOWNCOILERS

Produce

STRAIGHT SIDED COILS

STRIP WIDTHS 16" to 94"

GAUGES .047" to 3/8"

COIL DIAMETERS

Up to 74" O.D.
28" to 30" I.D.

COIL WEIGHTS

Up to 35,000 lbs.

SPEEDS

Up to 2,380 F.P.M.

Complete information, without obligation is yours for the asking.

UNITED®

UNITED

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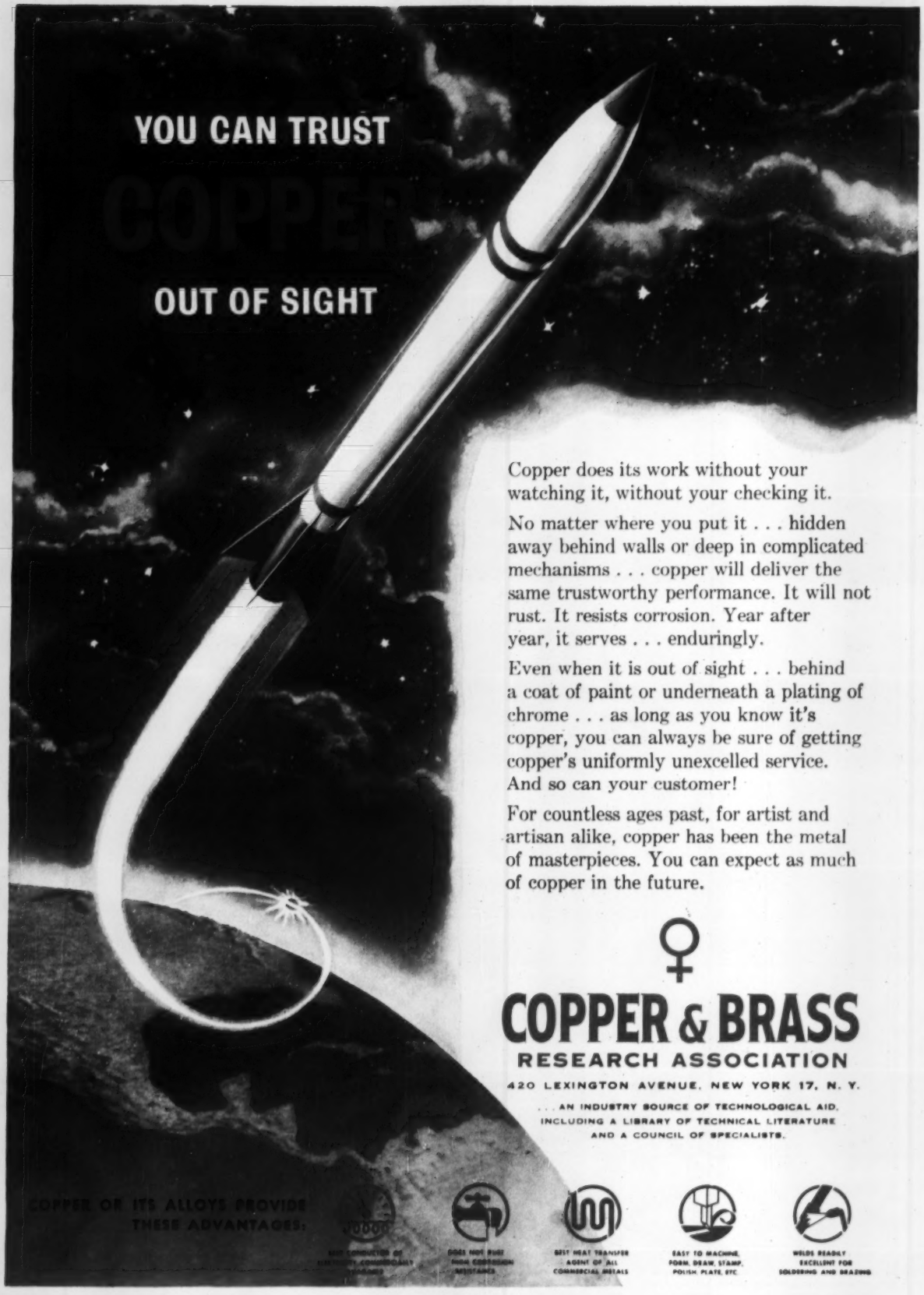
Pittsburgh, Pennsylvania

Plants at—Pittsburgh • Vandergrift • Youngstown • Canton • Wilmington (Lobdell United Division)

SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



Copper does its work without your watching it, without your checking it.

No matter where you put it . . . hidden away behind walls or deep in complicated mechanisms . . . copper will deliver the same trustworthy performance. It will not rust. It resists corrosion. Year after year, it serves . . . enduringly.

Even when it is out of sight . . . behind a coat of paint or underneath a plating of chrome . . . as long as you know it's copper, you can always be sure of getting copper's uniformly unexcelled service. And so can your customer!

For countless ages past, for artist and artisan alike, copper has been the metal of masterpieces. You can expect as much of copper in the future.

COPPER & BRASS
RESEARCH ASSOCIATION

420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

. . . AN INDUSTRY SOURCE OF TECHNOLOGICAL AID, INCLUDING A LIBRARY OF TECHNICAL LITERATURE AND A COUNCIL OF SPECIALISTS.

COPPER OR ITS ALLOYS PROVIDE THESE ADVANTAGES:

DOES NOT RUST
BEST HEAT TRANSFER AGENT OF ALL COMMERCIAL METALS
EASY TO MACHINE, FORM, DRAW, STAMP, POLISH, PLATE, ETC.
WELDS READILY EXCELLENT FOR SOLDERING AND BRAZING

MICROHONING*

PRECISION

in millionths of an inch

MICROHONING is inherently the most accurate of all production methods used for stock removal. Four major characteristics make Microhoning the controlled abrading process—that produces precision in every part.

Low velocity abrading technique
—low speeds (50-250 SFPM) minimize heat and surface stresses.

Sharp cutting abrasive grits at all times
—the self-dressing action provides clean, constant cutting and uniform surface finish.

Self-alignment of tool with bore
—use of the "float" principle . . . either the tool or workpart has universal action . . . automatically aligns tool and bore to correct bore inaccuracies without changing bore location.

Large area of abrasive in constant contact with work surface
—cutting pressure is evenly distributed over the surface by the thousands of minute abrasive grits collectively removing substantial amounts of stock. There is no localized heat to damage the surface or sub-structure of the metal.

An aircraft hydraulic pump block component, made up of cast iron and hardened steel (58-60 Rockwell "C"); nine ported cylinder bores are Microhoned to obtain surfaces which will maintain a "running" seal and which will not gall or "pick-up." From .006" to .008" stock is removed from each bore while holding these tolerances:

geometry—.000025"
diameter—.000050"

Steel surface finish is held under 8 microinches; cast iron, under 10 microinches. Bores of both sections are Microhoned in line in the same operation.

For a more complete story on this application, write for CROSS-HATCH, Vol. 7 No. 4.

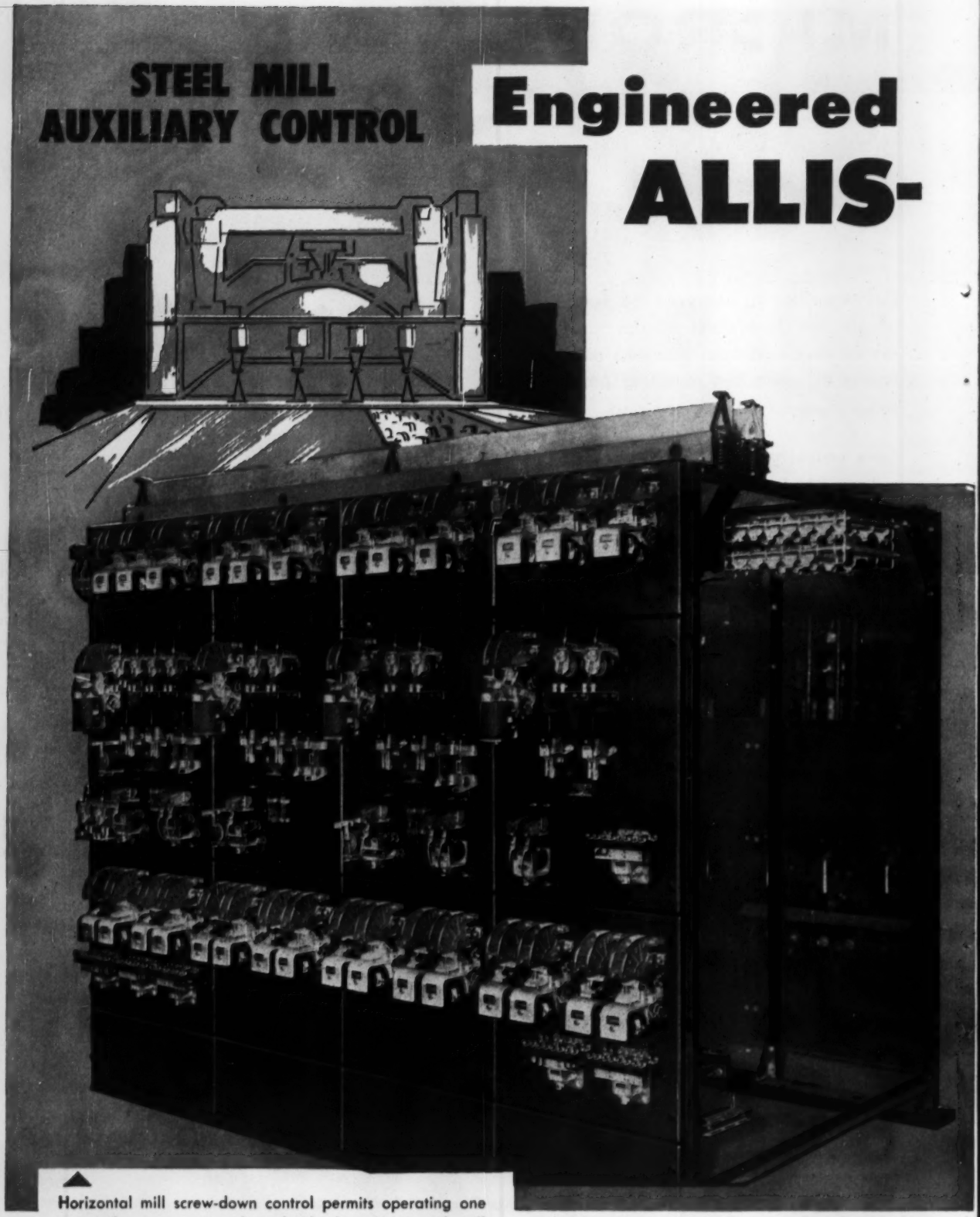
*MICROHONING = Stock Removal + Geometry + Size Control + Surface Finish

MICROMATIC HONE CORPORATION

8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

STEEL MILL AUXILIARY CONTROL

Engineered ALLIS-



Horizontal mill screw-down control permits operating one motor for two screws through clutches. Horizontal mill housing adjustment panel is a reversible dynamic braking controller. Vertical mill roll adjustment panels permit operating two motors in unison or individually.

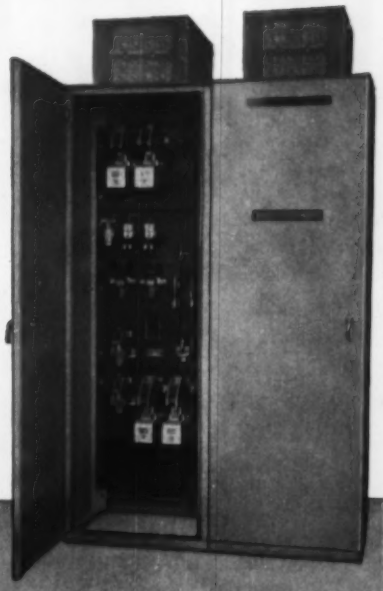
ALLIS-

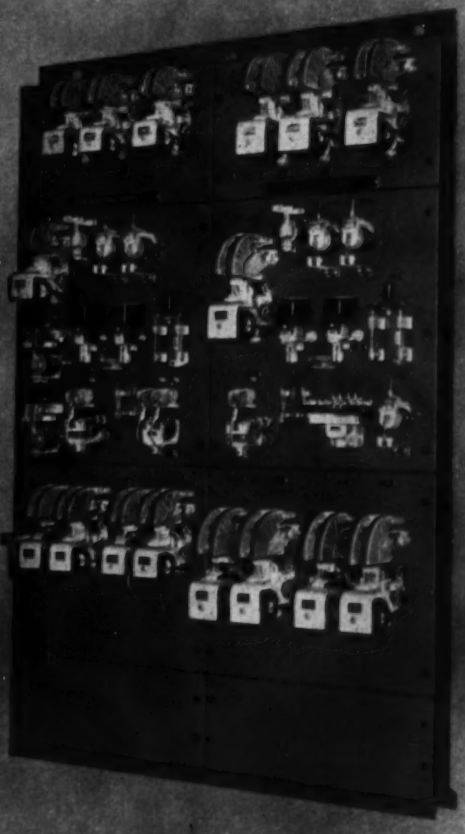
and Built by CHALMERS

INSTALLED in some of the nation's largest mills, these Allis-Chalmers mill auxiliary controls are providing smooth, precision performance . . . affording maximum production with a minimum of outage time and maintenance.

When you modernize or expand, take advantage of Allis-Chalmers experience and engineering skill in building steel mill control. For further information see your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wis.

A-4744

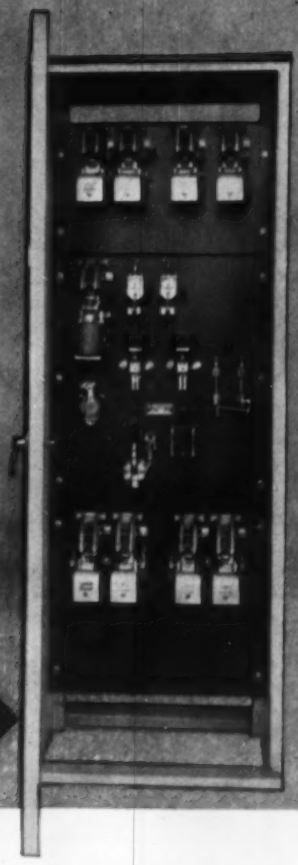




Motor control for hydraulic feed pumps. Non-reversible with field accelerating and field decelerating relays.

Two reversible controllers with dynamic braking and series brake for an upcut shear and shear pinch roll.

Reversible dynamic braking controller for roll conveyor. Operates at two speeds in either direction.



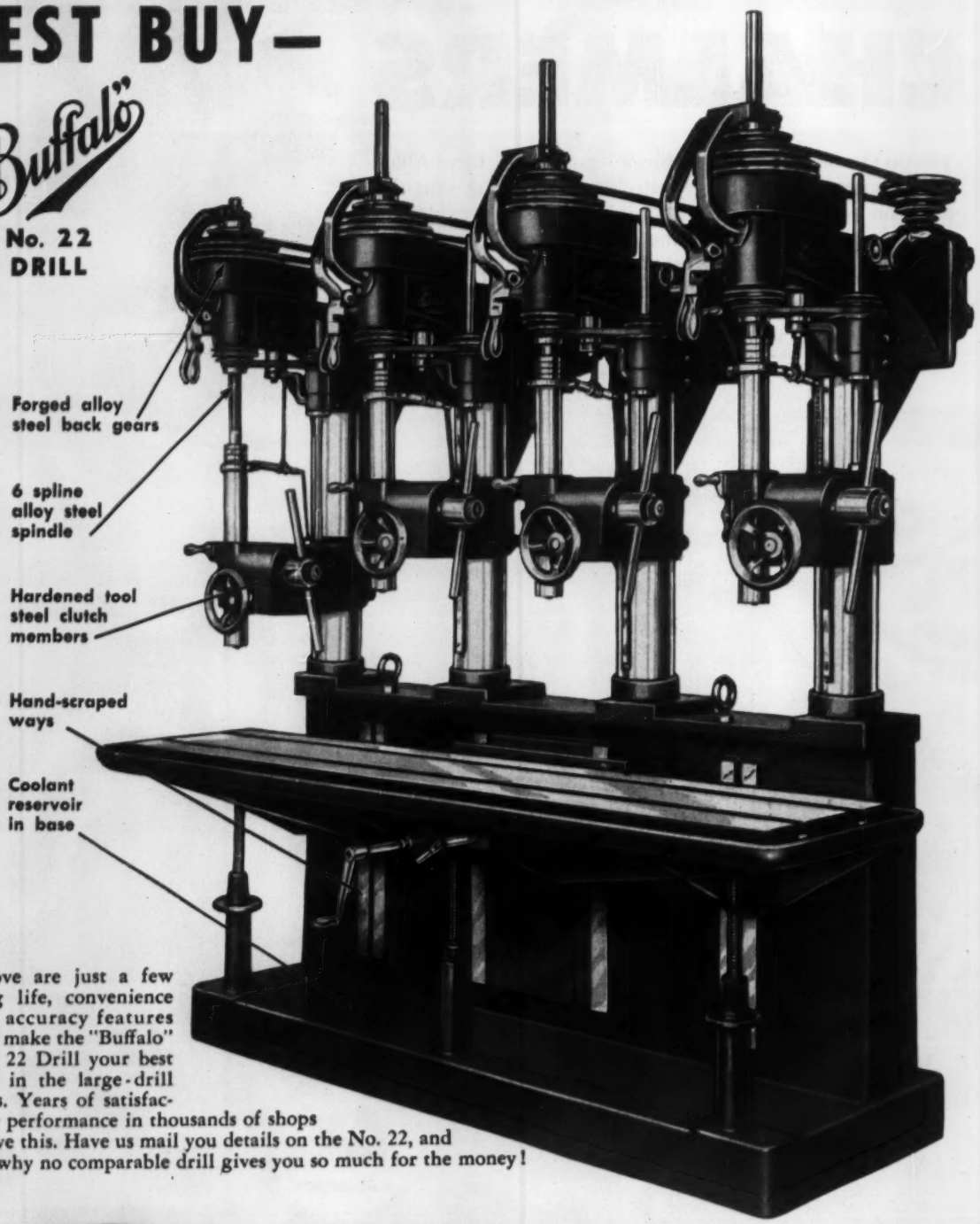
A-C ALLIS-CHALMERS

CHALMERS

SEE THE EXTRA PERFORMANCE FEATURES THAT MAKE YOUR BEST BUY—

"Buffalo"

No. 22 DRILL


Forged alloy steel back gears
6 spline alloy steel spindle
Hardened tool steel clutch members
Hand-scraped ways
Coolant reservoir in base

Above are just a few long life, convenience and accuracy features that make the "Buffalo" No. 22 Drill your best buy in the large-drill class. Years of satisfactory performance in thousands of shops prove this. Have us mail you details on the No. 22, and see why no comparable drill gives you so much for the money!

"Buffalo"

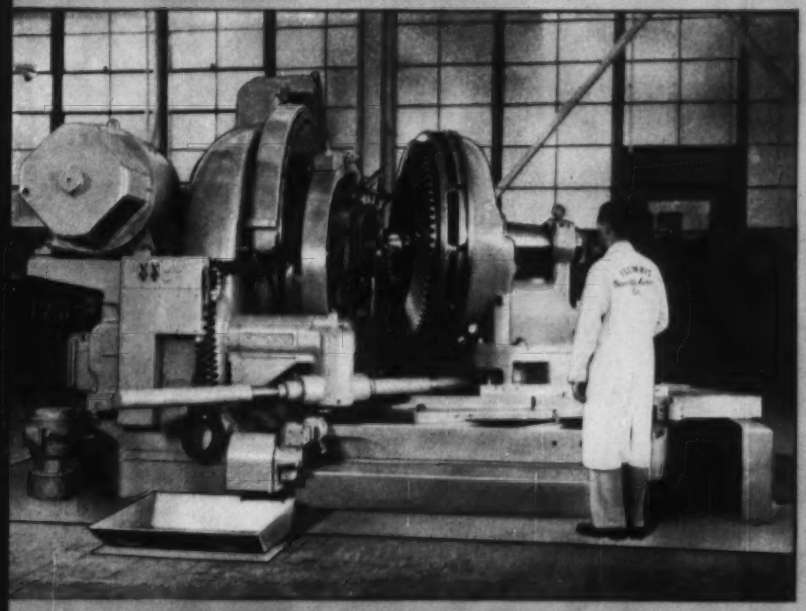
BUFFALO FORGE COMPANY

158 MORTIMER STREET BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

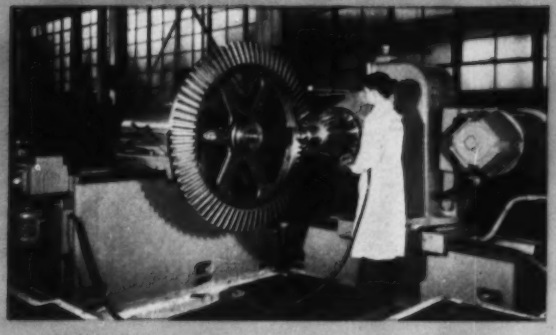
DRILLING • PUNCHING • SHEARING • BENDING

BIG SPIRAL BEVEL ZEROL BEVEL HYPOID GEARS

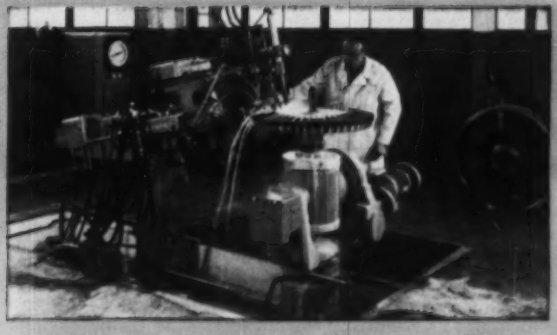


PRECISE GENERATION OF BIG BEVEL GEARS

This new No. 170 Spiral Bevel and Hypoid Gear Generator is the nucleus of the most modern and productive unit of large bevel gear generating machinery in the world. It generates spiral bevel, zerol bevel, and hypoid gears to 72″ diameter, 2.875″ tooth depth (.75 D.P.), 10″ face, and 10″ hypoid pinion offset above or below centers. The localized gear tooth bearing, an established necessity for today's heavily loaded gear drives, is precisely controlled to your specifications.



POWER TESTING—This new No. 61 Angular Hypoid Testing machine is the most advanced of its kind. Large spur, helical, herringbone or bevel gears are operated under load at any shaft angle, giving exact inspection of tooth contact under operating conditions. It will efficiently test gears up to 90″ diameter and hypoid offsets to 10″ above or below centers.



SURFACE HARDENING—This new No. 2 Flame Surface Hardening machine is closely controlled electronically to produce precise, uniformly distortion-free results—it's the all important climax to our large gear production facilities. Spur, helical, bevel and hypoid gears to 120″ diameter, .75 D.P., and 18″ face are surface hardened in this machine.

Visit our modern plants—see the finest equipped plants in the world—designed to serve you.

Look for this mark ILG *... the symbol on finer gears*

ILLINOIS GEARS Reg. U.S. Pat. Off.

Gears for Every Purpose ... one gear or 10,000 or more

ILLINOIS GEAR & MACHINE COMPANY

2108 NORTH NATCHEZ AVENUE • CHICAGO 35, ILLINOIS

"Best Operating Insurance Money Can Buy"

America's Finest!
GOULD
Industrial Truck Batteries

When you buy a Gould Research-Built Battery, you not only get the finest battery modern science can give you . . . you get also the finest, nation-wide field engineering service in the industry.

Strategically located in all principal cities, Gould Field Engineers are as near to you as your telephone . . . ready to help you get greatest possible service from your batteries and keep your facilities in operation. Through educational work with your maintenance staff, advice on selection and anticipation of battery needs and actual emergency servicing of batteries, your Gould Field Engineer is perfect operating insurance.

Call him in. You'll find it the best move you ever made. Don't forget to ask him for the new Gould Plus-Performance Plan material for your maintenance staff.

Always Use Gould-National Automobile and Truck Batteries

GOULD
Batteries

GOULD-NATIONAL BATTERIES, INC.
TRENTON 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"

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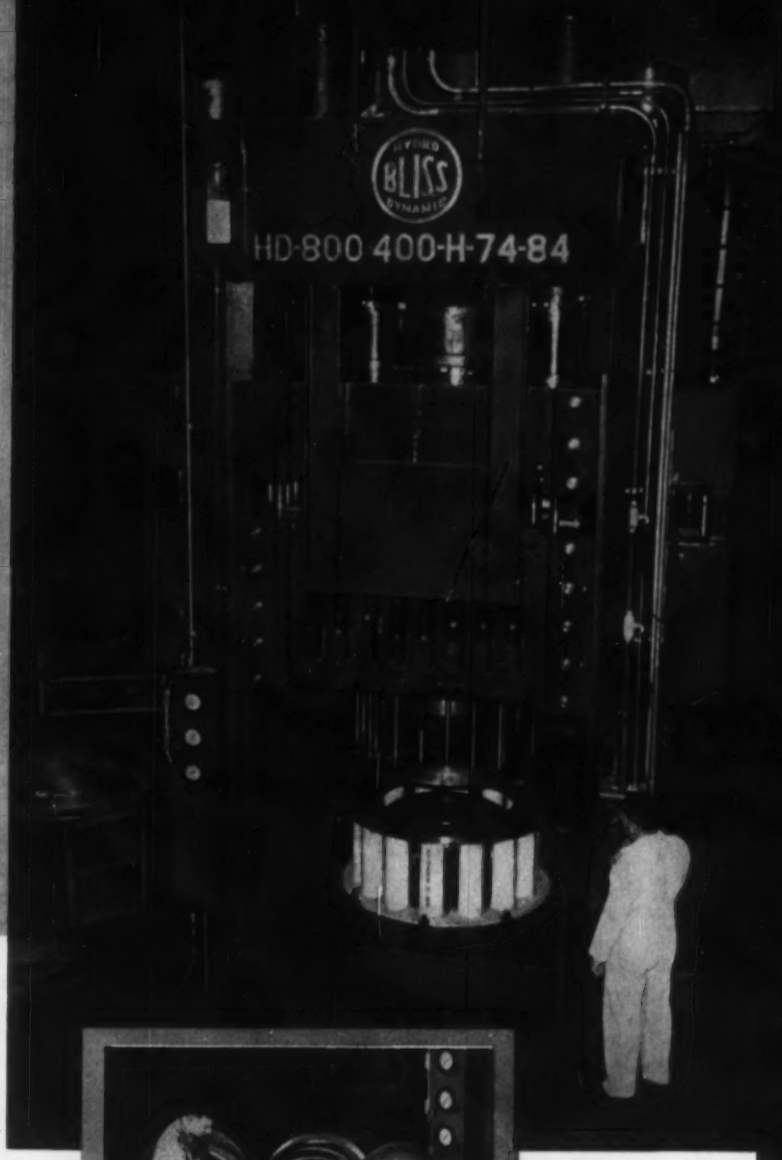
DOUGLAS AIRCRAFT LICKS A TOUGH ONE...

uses 800-400-ton Bliss Hydro-Dynamic Press to cut reject rate by 68%



FACED with a better than 70% reject rate on 52-in. diameter aluminum shells, a west coast sub-contractor almost sunk the project and himself in the bargain.

The part required a difficult deep draw—and then halfway through the draw cycle—a stretch into the final shape. Despite the stretch, the wall had to be held to a close tolerance.

To solve the problem, Douglas and Bliss engineers collaborated on the design of a special Bliss Double-Action Hydro-Dynamic Press—one which has a 100% pin pattern on the blankholder to give positive holding pressure all around the blank. That feature, plus precision guiding of the slide and accurate tooling, did the trick...

Rejects were cut to less than 2%

You can expect results like that when you use the right press for the job. It may be a single-, double- or triple-action press. It may require a rubber pad set-up. It may be a standard or a special-purpose press. But no matter what your problem, you can be sure of impartial counsel from your Bliss press engineer. Bliss, world's largest manufacturer of presses, makes both mechanical and hydraulic—grinds no ax for either—only for the *one* proper press.

For HYDRAULIC Presses, too ...it pays to specify BLISS

BLISS
SINCE 1857

is more than a name... it's a guarantee!

E. W. BLISS CO., Canton, Ohio
PRESSES, ROLLING MILLS, SPECIAL MACHINERY

U. S. Plants in Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; San Jose, California; Pittsburgh and Midland, Pa. Branch Offices in Burbank, Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Pittsburgh, Rochester, Salem, San Jose, Toledo, Washington, D. C., and Toronto, Canada. Other representatives throughout the world.
E. W. Bliss (England) Ltd., Derby E. W. Bliss Co. (Paris), France

All costs considered -- belt conveyors by LINK-BELT are your most effective means to

GREATER TON-MILE ECONOMY

Efficient, economical handling of bulk materials is provided by this 260-ft. Link-Belt conveyor with 24-in. wide belt. These conveyors can travel up or down grades as steep as 32%.

For large or small systems -- you get unrestricted selection of components and unmatched engineering background

CONTINUOUS operation, large capacity, flexibility, ease and infrequency of maintenance — belt conveyors offer many advantages unmatched by any other kind of bulk material transportation. And when they're supplied by Link-Belt, you enjoy additional benefits through unbiased choice of components and vast engineering experience.

Link-Belt equipment includes a complete line of idlers, trippers, drives, terminal machinery and other items. We can recommend the most practical combination for your particular job, with all elements having correct-rated capacities.

As for experience, Link-Belt is qualified by scores of installations in every industry. In fact, Link-Belt has been a pioneer in the development of belt conveyors for long or short hauls, indoor or outdoor service. As a result, our recommendations are based on methods proved successful in applications similar to yours.

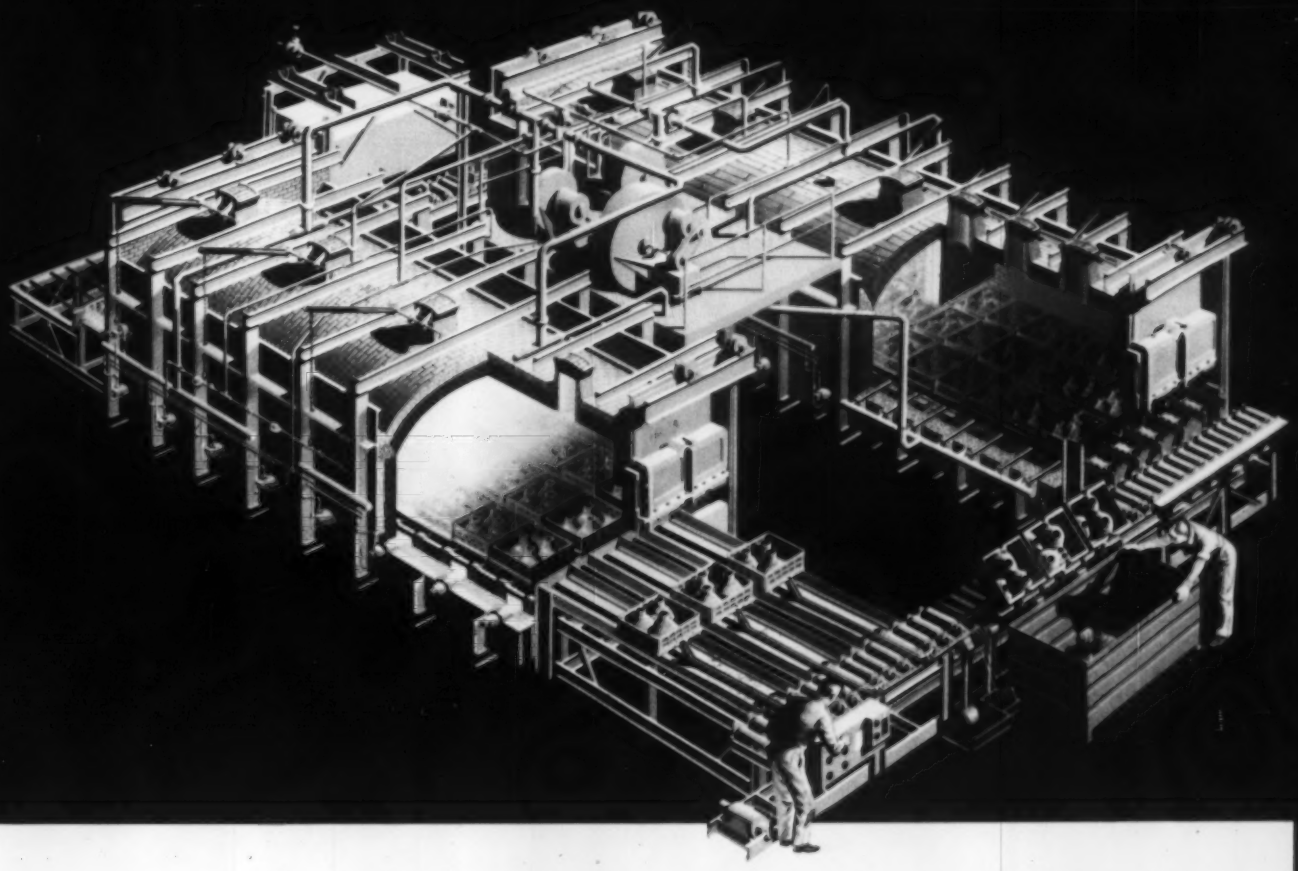
Your Link-Belt office will gladly fill in details on how belt conveyors can lower your handling cost per ton-mile. Call today.

Bearings, drives, supports and enclosures as required in this installation are also made by Link-Belt. Availability of all elements from one source saves delays and complications.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,950



You get automatic, precise heat treatment plus high production with this Salem-Brosius furnace

You speed production—control heat treating cycles to close limits—achieve specified metallurgical and physical properties in forged parts with this Salem-Brosius furnace.

This is possible because time, temperature and material movement are automatically controlled to provide precise cycle annealing practice. Rugged construction and simplified design give you efficient operation with low maintenance.

Here is a typical cycle. Forged alloy steel automotive parts, such as clutch plates and drive pinions, are loaded into three trays and positioned in front of the furnace pusher on the left. The furnace takes over.

The trays move automatically into the heat and soak chamber where the parts are heated to 1700°F. and held at that temperature for a timed interval. Then they move to the next section and are control-cooled to 1200°F. at which moment they move to the final zone and are control-cooled to 500°F. At this time the trays are ejected to a transfer table from which they are automatically emptied into tote boxes.

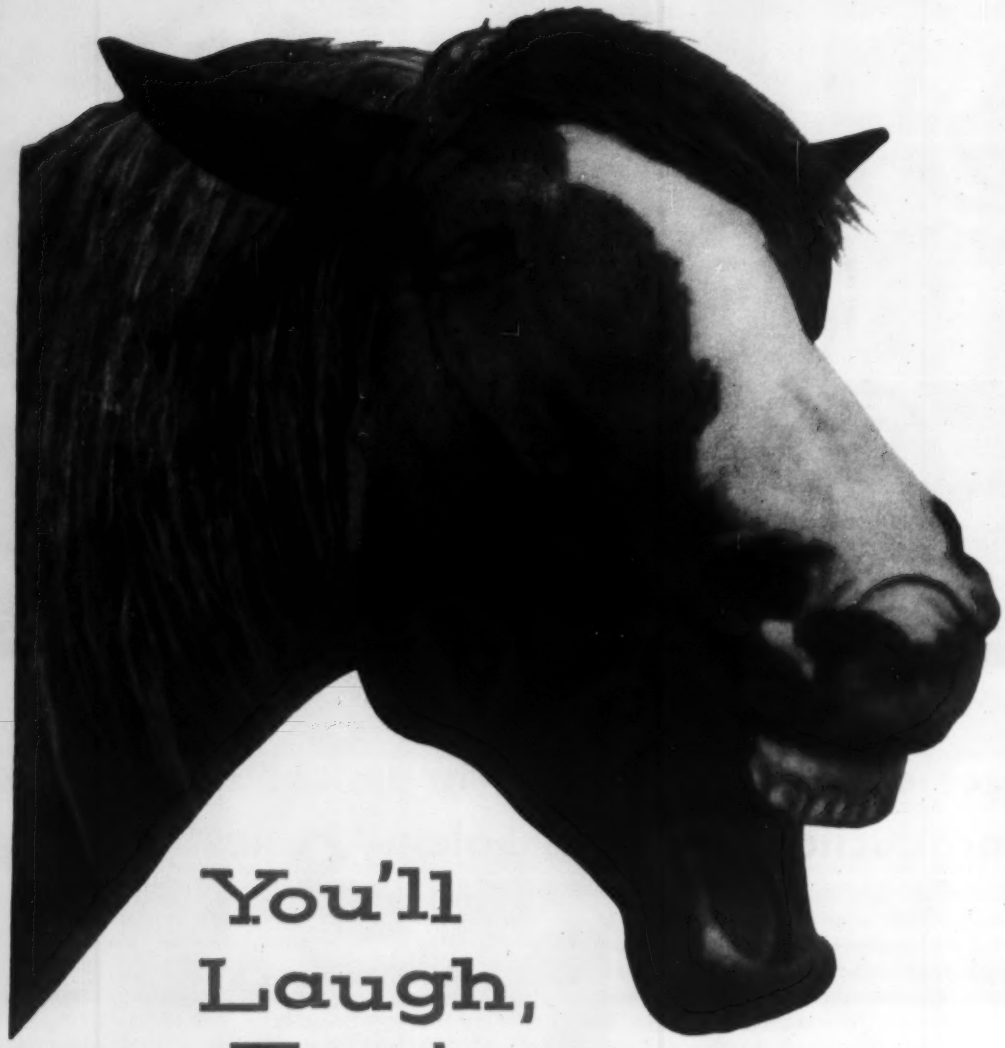
An ingenious arrangement of recording controllers, fuel regulators, thermocouples, and air control valves automatically hold the temperature to within extremely close limits. Yet this precise furnace anneals as much as 4000 pounds of forgings per hour.

This furnace is typical of the efficient heat treating and heating furnaces designed and built by Salem-Brosius to increase your production and reduce your unit costs. The skill and experience of Salem-Brosius engineers recently were augmented by the acquisition of the George J. Hagan Company so that now you get the benefit of the combined abilities of both organizations to design, engineer and build fine furnaces when you specify Salem-Brosius. Write to us!

SALEM-BROSIUS, INC.

CARNEGIE, PENNSYLVANIA

IN CANADA: SALEM ENGINEERING LTD. — 1525 BLOOR STREET WEST, TORONTO 9, ONTARIO



You'll Laugh, Too!

YOU'LL GIVE YOUR GRINDING PROBLEMS A LONG, DRAWN OUT HORSELAUGH WHEN YOU SWITCH TO CINCINNATI (PD) WHEELS.

For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that *can save you money . . . and increase your production.*

And you'll keep right on smiling with pleasure every day that CINCINNATI (PD) WHEELS are on the job. Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.* So, doesn't it make good horse sense to get full details on CINCINNATI (PD) WHEELS right away?

Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

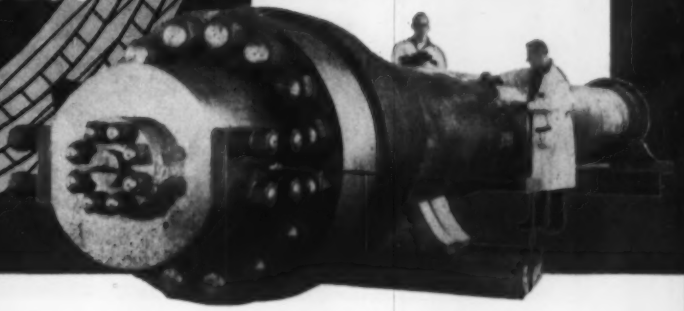
Remember—*only* CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

CINCINNATI *Grinding Wheels*

CYLINDRICAL SANDWICH OF STEEL...



A MULTI-LAYER PRESSURE VESSEL is built up from concentric layers of relatively thin steel plate progressively wrapped, tightened and welded together around an inner, pressure-tight cylinder. Inner layer is made like any solid wall vessel. This highly efficient, patented construction makes possible economies—*with safety and flexibility of design*—in heavy-wall vessels intended for use at extremely high pressures. United States Steel helped the manufacturer develop a special steel for these Multi-layer vessels.

saves money on heavy-wall, high-pressure vessels

With its ingenious Multi-layer pressure vessels, A. O. Smith Corporation opens up almost unlimited possibilities to the design engineer for commercial-size vessels for unusually high pressures—from 7500 to 30,000 psi. Instead of using hard-to-fabricate, heavy-gauge plates, A. O. Smith builds up the thick walls of these vessels with multiple layers of thin steel. As a result, welding conditions are improved and stress relief is not needed. Consequently, Multi-layer fabrication of heavy wall cylinders is more economical.

USS METALLURGICAL SERVICE HELPED SOLVE THE PROBLEM

When A. O. Smith engineers first conceived Multi-layer construction, process pressures were within limitations of standard A.S.T.M. steel strengths. However, as pressure demands increased, A. O. Smith needed a new and very special steel. And that is where United States Steel came to their aid. We helped them develop a high-tensile, high-yield strength, low-alloy plate steel with a minimum ultimate strength of 105,000 psi., a minimum yield strength of 70,000 psi., and good weldability.

HELP FOR YOU

When you have any sort of steel problem, let USS metallurgists help you with it—whether you need a special steel or just want to be sure you have the *very best* of the standard AISI analyses for your job. Phone our nearest district sales office. Or write United States Steel, Room 5061, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

See The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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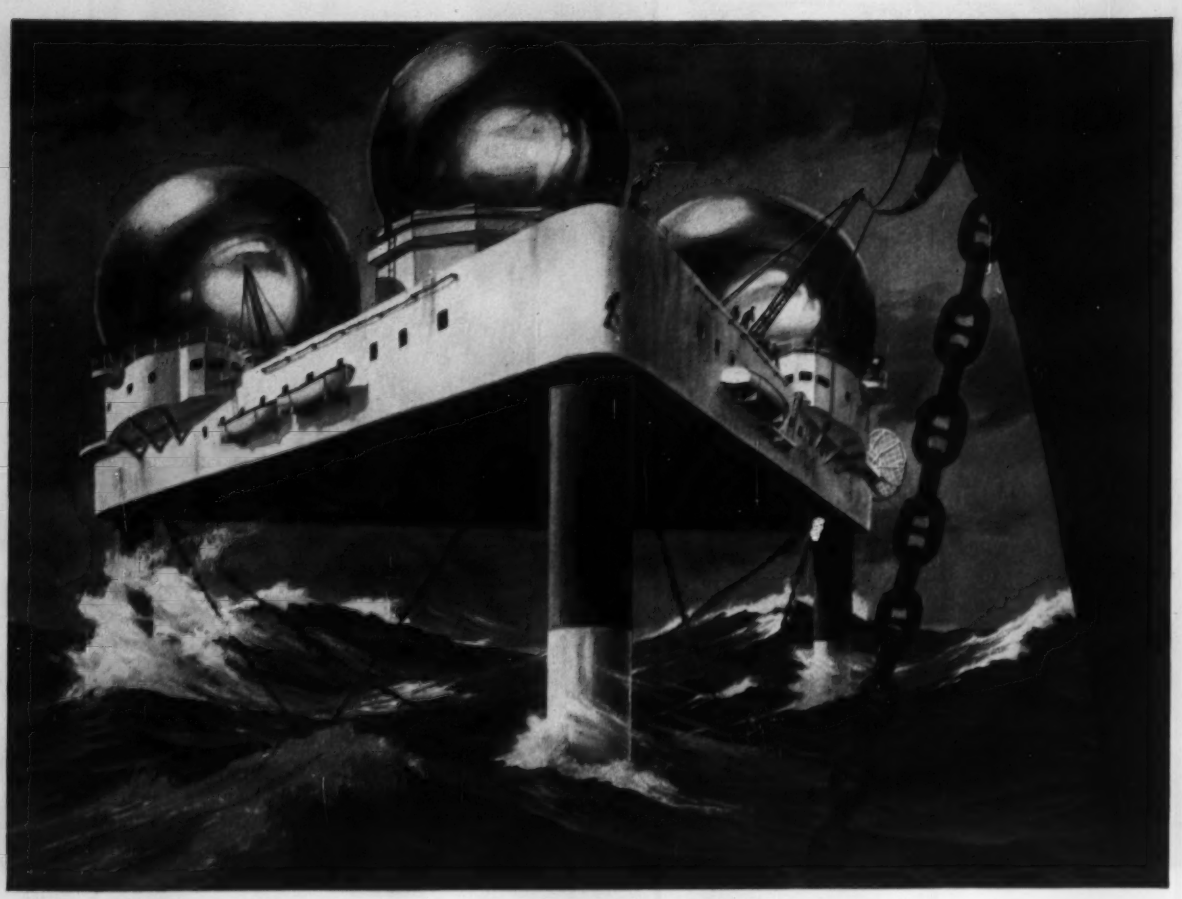
S-2213

ELECTRIC FURNACE OR OPEN HEARTH

COMPLETE PRODUCTION FACILITIES IN CHICAGO OR PITTSBURGH

UNITED STATES STEEL



100 miles out in the Atlantic:

Monel keeps "sea legs" sturdy under the Navy's man-made islands

A radar network at sea! That's what the United States wanted.

But how to do it was a question. Using boats offshore wasn't the answer. Nor planes. Nor balloons.

Then somebody came up with a startling idea. A string of artificial islands! Build them on the Continental Shelf from Nova Scotia to the Virginia Capes.

Again there were problems. How would you build these offshore radar platforms in deep water? The design has to take into consideration many hazards. Among them pounding waves. Tides. Hurricane winds. And corrosion!

Salt water and steel pilings make ugly neighbors. This is particularly true at the water line — in what is technically known as the "tidal and splash zone." Surfaces are sometimes wet, sometimes dry. Corrosion has a field day if you give it half a chance. The Government men benefited by the experience of oil men. Drilling out in the Gulf of Mexico, they had found the answer:

Steel with an outside layer of Monel nickel-copper alloy permanently bonded to it for protection!*

Like all Inco Nickel Alloys, Monel nickel-copper alloy never rusts. And it has high resistance to corrosion by salt water . . . salt air . . . salt spray. It does a job no other material can do. And does it well.

Do you need a metal to withstand destructive conditions? Corrosion? High temperatures? Fatigue? Then write for the booklet, *Standard Alloys for Special Problems*. It answers many questions about Monel alloy and other Inco Nickel Alloys. Puts you squarely on the track of the Inco Nickel Alloy best suited for your purpose! Write for this valuable booklet — *today*.

*Registered Trademark

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

50 YEARS OF *Nickel Alloy Progress* PIONEERED BY MONEL 1905 - 1955

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INTERNATIONAL NICKEL
67 Wall Street New York 5, N. Y.
Nickel Alloys Perform Better, Longer

STEEL

December 12, 1955

Metalworking Outlook

Tax Topics

At least one important congressman doesn't think Congress should lower taxes generally in 1956. He's Rep. Wilbur Mills (Dem., Ark.), ranking Democrat on the tax-originating House Ways & Means Committee. He's also chairman of a House-Senate subcommittee investigating the impact of taxes on the economy. Testimony early last week from nongovernment economists was unanimously against tax cuts. Mr. Mills said he agrees with their views, but he notes that 1956 is a Presidential election year and that politics, not economics, will probably determine tax policy.

Pentagon Relaxes a Rule

The Defense department has eased the requirements of a directive which limited payments on incentive-type and price redetermination-type contracts to 105 per cent of certified costs. That means that payments will no longer be limited to 105 per cent of cost until final pricing of the contract. It also means that contractors no longer need to certify each individual billing. Similarly, quarterly reporting has been simplified.

Auto Suppliers: Tough Times Coming?

Companies primarily engaged in the production of original equipment for autos won't perform so well over the next three to five years as they have during the last decade. So says *Value Line Investment Survey*. It believes the dynamic spurt of the auto industry appears to be topping out, at least temporarily. The result will be increased pressure by auto assemblers on parts companies to reduce their prices and an accelerated trend by the five auto builders to make more of their own parts.

More About Birthmarking

The Defense department wants its marking standard extended to more steel products. But continuous marking would not be required as it is on 75 products to which the standard already applies. The expense of continuous marking already jeopardizes the standard, so the Pentagon is easing up on that requirement for the new items which are mostly large-tonnage products. A proposal for extension is being circulated to industry and within the department. The aluminum standard is almost ready for issuance; producers are already marking their metal. A nickel marking standard is being circulated again through industry and the Armed Services. Plans are stalemated at the moment for a copper marking standard because there aren't any industry-wide commercial designations.

More Power Ahead

"We will have to more than double our generating capacity within the next ten years," says O. B. Falls Jr., manager-marketing for General Electric Co.'s Atomic Power Equipment Department. This year, the nation will

Technical Outlook—p. 95 Market Outlook—p. 145

use about 476 billion kw-hr. By 1964, he estimates, we will need 1040 billion kw-hr. GE studies show that 14 per cent of all new generating plants going into service in 1970 will be nuclear powered; 65 per cent of all additions to generating capacity in 1980 will be atomic.

Needed: 50 Million Stockholders

To meet the cost of expanding our utilities and other businesses, we need to raise the number of stockholders in American industry to 40 or 50 million, compared with the present 6 or 7 million. That's the opinion of GE Chairman Philip D. Reed. Particular attention must be given to encouraging more and more families in the $5000-to-$10,000 income bracket to invest part of their savings, he says.

Transformation in Coal

Coal output is running 20 per cent ahead of 1954 levels and should approach the 1953 record of 457 million tons. Aside from high-level requirements in the U.S., a major reason for the gain is rising demand from Western Europe. Coal reserves there are becoming so depleted that concern is mounting. Research abroad is active to find substitutes for the fuel.

Boom in West German Steel

West German steel plants are refusing new orders because they have 6-to-10-month backlogs on common grades of the metal. Commitments have piled up 12 to 14 months in advance on special steels. As in the U.S., the shortage is especially severe in plates. In negotiation now are higher wages for steelworkers, but the increase is not likely to boost present German steel prices.

Canadian Construction Climbs

The 1955 investment in new construction in Canada will hit $4.1 billion. That's up from $3.7 billion in 1954. The total includes 120,000 new houses, compared with 102,000 in 1954. Prospects for 1956: Even more building, especially because there will be high outlays for gas and oil pipe lines.

Straws in the Wind

Comments one American purchasing agent: Shortages of many raw materials indicate that industry is suffering a surplus of prosperity . . . Kaiser Steel Corp. is studying the possibility of a major expansion in steel production and rolling mill facilities at Fontana, Calif. . . . Retail toy sales in 1955 look like they'll reach $1250 million, a record . . . Square D Co., Detroit, and Electric Controller and Mfg. Co., Cleveland, have called special stockholder meetings for Dec. 28 to vote on merging the two firms; Square D would be the surviving corporation . . . Class I railroad income in October climbed to $92 million, compared with $77 million in the same 1954 month . . . General Motors Corp. has offered its auto dealers five-year franchise agreements to supplant the traditional one-year contract.

Armco 17-7 PH Stainless Rates Tops at 300-800 F on

STRENGTH-WEIGHT BASIS

Guided Missile pressure-booster tank of Armco 17-7 PH is tested at 3500 psi pressure—a calculated average stress of 169,000 psi. This metal also is used for fuel tanks, to contain red or white fuming nitric acids and other oxidizers.

On a *strength-weight* basis, Armco 17-7 PH Stainless Steel is unexcelled for service at temperatures of 300 to 800 degrees F. In this temperature range, Armco 17-7 PH has these pound-for-pound characteristics in comparison with the best ferrous and non-ferrous metals:

- *UNSURPASSED SHORT-TIME TENSILE STRENGTH*
- *SUPERIOR SHORT-TIME YIELD STRENGTH*
- *HIGHER STRESS-TO-RUPTURE STRENGTH*
- *HIGHER CREEP STRENGTH*

Yet Armco 17-7 PH is not a costly metal. It is well within the stainless steel price range. Besides having fine corrosion resistance, it is readily fabricated and welded in the soft condition—draws and forms much like 18-8 stainless steel. After fabrication, it takes only a low-temperature double heat treatment at 1400 F plus 1050 F to develop its high mechanical properties.

Armco 17-7 PH is supplied in sheets, strip, plates, bars, angles and wire.

For complete data, just fill out and mail the coupon.

Armco Steel Corporation, 1525 Curtis Street, Middletown, Ohio
Tell me why Armco 17-7 PH is unexcelled on a strength-weight basis for service at 300 to 800 degrees F.

Name:_____

Firm:_____

Street:_____

City:_____ Zone:_____ State:_____

ARMCO STEEL CORPORATION 1525 CURTIS ST., MIDDLETOWN, OHIO

SPECIAL STEELS

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

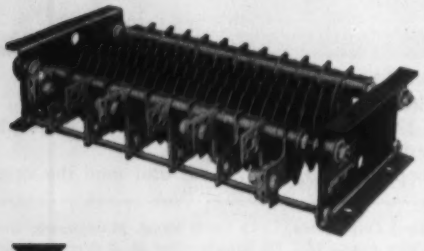
The welded grid assembly is shown here as a unit resting on narrow iron straps above its end frame, support rods, and spacers.

TAB • WELD

CONSTRUCTION does what clamping could not do

•

Stabilizes OHMIC VALUE independent of end clamping-nut pressure



▼

NO NUT TIGHTENING because burning does not occur

It's difficult to find "down-time" for servicing industrial equipment. Short lulls in production do not always permit time for a complete service job. Forgotten or unserviced items operate at lower efficiency—may eventually fail and require major repair or replacement.

When buying motor control resistors, do not overlook the low upkeep advantages of EC&M TAB-WELD Resistors. These plate resistors are off-set to bring grid-eyes into intimate contact and the tab-ends are welded. Tap-plates are also welded in place at convenient points. *No burning at grid-eyes or at tap-plates.* When replacing resistors or for new installations, specify EC&M Bulletin 942 TAB-WELD Plate Resistors.

LOWER UPKEEP saves the inital cost and more

THE ELECTRIC CONTROLLER & MFG. CO.

4498 LEE ROAD ★ CLEVELAND 28, OHIO

Labor's Opportunity

Last week, the 109 unions organized under the banner of the American Federation of Labor and the 32 in the Congress of Industrial Organizations were formally welded into a single union with 16 million members.

As the most powerful union organization in the world, it could look back on a growth of 400 per cent since the turbulent days of the New Deal. The old issue of AFL craft or trade unions versus CIO industry unions could be forgotten. So could the raiding of membership and many of the personal animosities. So could the $1.7 million John L. Lewis claimed his United Mine Workers loaned the CIO to get it started in 1935.

In an era of peak U. S. prosperity, the powerful new union is setting its sights on these goals:

1. The return of a larger share of industry's profits to mass circulation through still higher wages.

2. The organization of additional millions of workers, especially in the South.

3. The expansion of union-sponsored educational and apprenticeship programs for technical training of unskilled and semiskilled workers.

4. The extension of Supplementary Unemployment Pay to cushion the shock of changing to the age of automation.

5. The establishment of the 30-hour week to multiply job opportunities and keep unemployment in hand.

6. The election of candidates to Congress and state legislatures who are willing to support the labor program, including repeal of the Taft-Hartley Act.

The AFL-CIO is bursting with new power. How it will use that power will be made known at the polls and at the bargaining table over the coming months.

Union leadership has the opportunity to exert excessive pressure for concessions and benefits that could seriously impair the ability of industry to provide jobs.

Union leadership has equal opportunity to work hand in hand with management in the orderly achievement of the social progress every American is entitled to.

A greedy, short-term policy will be at the expense of the AFL-CIO over the long pull. Labor statesmanship will be to the lasting mutual benefit of labor and management.

Irwin H. Such
EDITOR

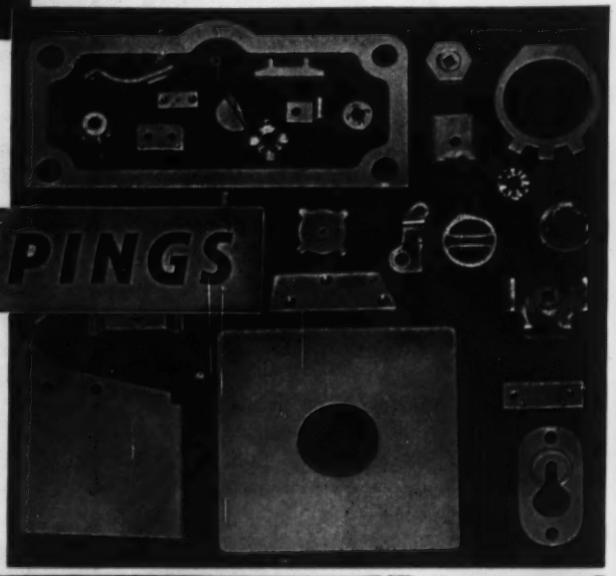
LEADERSHIP *Backed by*
68 Years of Continuous Service to American Industry

MILWAUKEE WROT WASHERS

SINCE 1887

In terms of "satisfaction to the customer" the dominant leadership of Wrought Washer Mfg. Company in this specialized field represents not only a thoroughly dependable source of supply to meet all your requirements for Standard and Special Washers, but of equal importance, it carries with it a wealth of technical know-how dealing with a wide variety of production and design problems . . . available to you as a gratis service. More than 25,000 sets of dies "in stock" at our plant offer the greatest range of selectivity.

Our equipment for handling contract production of stampings includes presses for blanking, forming, drawing, shearing and extruding. In many cases it is possible to produce stampings at a lower cost than they can be produced in your own plant, with our own equipment. Our own tool and die-making shop enables us to make up the necessary tools to fit your specifications.



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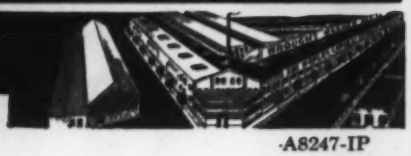

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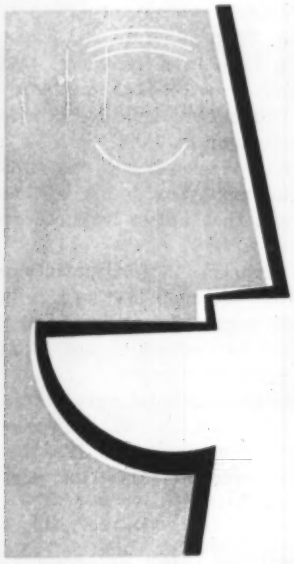


In 1956 . . .

Labor Wants: More Money . . . Extended SUP . . . Vesting . . . More Holidays, Vacations . . . Better Insurance, Pensions . . . Union Shop

Management Wants: Longer Contracts . . . No Interference with Right To Manage . . . Differentials for Skill, Productivity . . . More Workable Contracts . . . Longer Probations

Next Year's Labor Outlook

"FOR TWO DECADES the labor leaders have come around every year or two with a pistol in their hand and say: 'Mr. Employer, pay more or I shoot.' Each time employers have paid more. This game is nearing its end. Reality has caught up with the collective bargaining table. Wages can only be raised in proportion to the increase in productivity."

So writes Harold J. Ruttenberg in the December *Harper's*. Mr. Ruttenberg is a one-time CIO economist who says he "invented" the Guaranteed Annual Wage. Today, he's president of a drilling machinery manufacturing company whose 243 hourly workers belong to the United Steelworkers of America.

Agreement — Other businessmen also sense a changed climate in labor - management relations. "We're starting a new era when management can and must present strong demands just as labor does," say spokesmen for Associated Industries of Cleveland, an association dealing in personnel relations of companies in greater Cleveland.

Says a Pittsburgh employer: "And 1956 is the year to get started. It looks like a boom period. We can afford some economic concessions. But we must trade those for concessions from labor." Of course, management has long been presenting demands to labor, but many analysts think they've been weak usually.

What management wants varies from company to company, but generally, those listed above summarize the major needs.

Longer Contracts—Some management men favor the annual contract because of its flexibility, but the majority seeks a two or three-year document because of its promise of longer freedom from labor harassments. Settlements involving pensions, Supplemental Unemployment Pay and some forms of social insurance make a long-term contract a necessity. Not practical on a yearly basis are arrangements with banks and insurance companies that those types of provisions require.

Right To Manage—Management must be sure that its next contract doesn't contain some stipulation that interferes with its right to transfer, fire and promote, lay off and recall employees. And management is becoming increasingly aware of the need to do those things as free from seniority considerations as possible.

Differentials — Industry recognizes more and more the necessity of paying on the basis of skill and productivity. But the problem is to set up some standards of skill, particularly in the small and medium companies. An approach to the matter might be an adaptation of the large steel companies' job classification and description system. Such a setup, with its 6-cent pay increments between job grades, might answer the complaints of the highly skilled, too. "They're restless," comments James Wible, director of personnel for Weatherhead Co., Cleveland, "because they see the pay scale narrowing between them and the unskilled."

Workability—Management needs to have more to say in the establishment and description of work standards and in the elimination or consolidations of job classes. Important, too, is a workable grievance procedure. Says one industrial relations director: "In our plant, more grievances arise in this workability area than in any other."

Longer Probations—Most probationary employees aren't included in contracts. The statutory minimum is 30 days for a new worker to be on probation. In the majority of contracts, the bargained limit is also 30 days. Employers are finding that provision is often troublesome. A man's skill or lack of it often can't be established in 30 days. Needed are longer probationary periods—to vary with individual circumstances.

What labor wants in 1956 is what it always wants—more. Because the first quarter is going to be sensationally good economically and because that's the period most unions pick in bolstering their arguments that industry can "afford" to grant an increase, the wage demands—and all other demands for the year—are going to be high. Settlements will, of

course, be lower, even a little more subdued than in 1955. That's because of the situation Mr. Ruttenberg mentioned. Labor leaders don't recognize it publicly, but it's forcing itself to be recognized at the bargaining table. Many observers feel that gimmicky demands—SUP, shorter workweeks, more insurance and pension—came because industry is getting tougher about granting the basic demand, higher wages. It's not always true, but fringes usually cost less than straight pay hikes.

Money—Next year, granted the assumption of good business for most of the period, look for wage increases that will average 8 to 10 cents nationally, compared with 10 to 12 cents in 1955. As a result of agitation by skilled workers, they should do a little better than semi and unskilled people.

SUP — Supplemental Unemployment Pay is not proving to be the potent rallying cry organized labor hoped it would be. Skilled people are lukewarm about it. But it's still potent enough to be a major issue in the important steel negotiations next spring. And the CIO auto workers will demand it. A little more than half their contracts still don't contain the provision. In basic steel, David McDonald will go after a full year's SUP like he won for the canworkers. It's unlikely that he'll get it, although he may win a package that's a little broader than the autoworkers wrapped up.

Vesting—The policy of putting pensions on an individual basis so an employee can take his accumulated total if he leaves a company before retirement is becoming widely accepted. Organized labor is toying with the idea of extending it for SUP. It has been tried in the contracts with the glass companies. Look for it to be tested in a few more instances in 1956. But it won't be a major issue next year.

Holidays, Vacations—Expect the usual pressure here. It will be especially strong for the seventh holiday—election day, the employee's birthday or half days before Christmas and New Year. One demand that's cropped up with increasing frequency this year: Double time for all hours of 11 and more in a 24-hour period, with the conventional time and a half for the ninth and tenth hours. A parallel demand is for time and a half on the first four hours on Saturdays and double time for work over four hours on that day.

Other Fringes—The unions will demand customary liberalization of insurance and pensions, too. Theoretically, the steel companies need not discuss either of these issues next summer, but odds are that they will permit all phases of the contract to be opened. What they grant can be a pattern for much of industry.

Union Shop — Auto companies gave in here in a provision that was almost overlooked last summer. Unions will fight for it with renewed vigor in 1956.

35-Hour Week—It will be a talking point next year, but it will remain just that unless business relapses.

The crucial 1956 negotiations will be in steel next May and June. Aircraft companies parley earlier, but their settlement is not likely to be pattern-setting.

Labor experts point out: A combined AFL and CIO will be speaking louder next year. It's time that management raises its voice, too.

• Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Employment will climb in '56; nationwide strikes unlikely

Productivity Study Released

American manufacturing industries registered an average annual productivity gain of 3 to 3.6 per cent between 1947 and 1953. From 1939 to 1947, the average annual gain was 0.5 to 1.5 per cent.

Those are the conclusions of the Labor department in its first study of output per man-hour since 1942. Says Ewan Clague, commissioner of labor statistics: "The 1947-53 average is in line with the average gain of 3.3 per cent between 1909 and 1939, the long-run period covered by previous bureau estimates."

The figures will provide ammunition for management and labor in contract negotiations and in fights over effects of automation. Still to come are the Labor department's automation studies. They'll probably be released early next year.

Electronics Boom in L. A.

More than $22 million was invested in new plants and expansions by the electronics industry in metropolitan Los Angeles in the first ten months of this year.

The Los Angeles Chamber of Commerce says billings of the 436 electronic firms in the area are $916,680,000.

H. Leslie Hoffman, chairman of the chamber's electronics committee, anticipates billings next year will reach $1 billion.

Kohler Strike Timetable

Dec. 12, 1953 . . . Kohler Co. announces its intention to terminate contract at its expiration on Mar. 1, 1954.

Feb. 28, 1954 . . . Union membership votes to take strike vote.

Mar. 14 . . . Union executive board authorized to call strike.

Mar. 26 . . . Union announces strike will be called Apr. 5 if no agreement is reached by then. Negotiations break off.

Apr. 5 . . . Strike called. Plant production shut down for 54 days. Two-month period of mass picket lines, violence.

May 6 . . . After company appealed to Wisconsin Employment Relations Board for injunction to halt mass union picketing, plant reopened. Three days later the union picket lines formed again.

June 1 . . . Picket lines were reduced and nonstriking employees got production under way again. Negotiations resumed between company and union with Wisconsin Employment Relations Board sitting in.

June 29 . . . Negotiations locked, union charges company walked out.

July 12 . . . Union files with National Labor Relations Board, charging unfair labor practices by Kohler.

Aug. 10 . . . Parties meet with Federal Conciliation Service. Union drops several demands including wage increase.

Nov. 10 . . . Union submits proposal to build contract within framework of Kohler's competitors, Crane Co., American Radiator & Standard Sanitary Corp., Briggs Mfg. Co. If this fails, union proposed submission of issues to arbitration with understanding that no award could exceed provisions of competitors' contracts with CIO.

Jan. 28, 1955 . . . Federal Mediation & Conciliation Service calls parties to Washington to negotiate.

July 26 . . . Federal Mediation Service at Chicago meets with parties. Union drops maintenance of membership demand, accepts Kohler's health-medical plan instead of Blue Cross-Blue Shield plan. Kohler offers to take back 540 workers—none of 90 fired union leaders.

Kohler Strike: Case Study

IN LISTING its demands for a new contract, the UAW-CIO threw the book at Kohler Co., a seemingly minor power when stacked against the auto giants the union normally tackles. But the union had no idea of the ferocity with which its demands would be hurled back.

The exchange set off one of the bitterest and longest strikes in the postwar period. And the $7 million the CIO-UAW has pumped into it makes it one of the union's most costly campaigns.

Queries—The strike is entering its 21st month. How near is a settlement? A better question: Can it be settled?

To Herbert V. Kohler, president of the Wisconsin plumbing fixture firm, basic issues involving the nation's free enterprise system are at stake: Compulsory unionism, discounting of the individual's merit, joint company-union management, pattern settlements, inflation through granting wage increases not justified by productivity increases.

To the union which won representation of the workers only a year before, here is a company yet to catch up with accepted industrial union contracts: "Wages on an hourly basis are lower than the average of the company's industry; seniority means little; there is no standard arbitration procedure on disciplinary action or discharges; no union shop."

Tough Opponent—Kohler is a family-owned firm, with no stockholders to answer to or get pressure from. The company had weathered a bitter strike in 1934 in which two lives were lost. The issue then: AFL representation. It ended in a National Labor Relations Board election in which the AFL was rejected. From then until 1951 an independent union represented the employees. That year, an election was held for representation by AFL, CIO or independent union. The last won, but a year later the CIO got in by 78 votes in another election.

In a prerogative seldom exercised by industry today, Kohler made the first move in the current situation. It announced (see timetable) its intention of terminating the contract covering about 3300 production and maintenance workers.

Stalemate—When the bargaining sessions failed to produce little more than the companys' offer to renew the old contract without change, the union threatened a strike and negotiations collapsed immediately. Kohler walked out, charges the union.

With the strike on Apr. 5, 1954, came mass picketing. Production was stopped for 54 days. Detroit goon squads appeared and violence

shook the small Wisconsin town of Kohler.

New Issues—The company answered the union's strong-arm tactics with its own, and from developments in the next two months sprang new problems which now loom as the key issues in the situation.

1. Management refused to continue negotiations as long as mass picketing continued.

2. The company fired 90 people, all union officers, picket captains and stewards except one.

3. The company appealed to the Wisconsin Employment Relations Board to direct the union to cease unlawful picketing. The plant opened June 1, and production got under way slowly, with nonunion employees passing through peaceful picket lines. Management announced at the time that no new employees hired would be discharged to make room for returning strikers when the strike was over. (This is in accordance with Taft-Hartley.) Workers were given a 3-cent per hour wage increase.

Enter, NLRB — These brought NLRB action against the company through union charges of Kohler's failure to bargain in good faith.

The regional NLRB holds that 12 of the firings were justified because of illegal conduct, but that the other 78 were discriminatory. Hearings are still under way and will probably last another two or more months.

New Union Points—After the plant reopened in June, several meetings, including some with the Federal Mediation & Conciliation Service were held (see timetable). Result: The union has backed down to seven basic points.

1. Arbitration for grievance procedures, including disciplinary action and discharges.

2. Full seniority rights.

3. Reduction of wage demands to 10-cent, across-the-board increases.

4. Noncontributory pension plan.

5. Lunch period for the enamel shop, which has none at present.

6. Reinstatement of all 90 workers fired.

7. When the strike ends, all strikers to be returned to original jobs.

New Kohler Offer—The company has offered these proposals:

1. Increase its wage offer to 5 cents, all nonincentive workers to get 10 cents.

2. It will take back all workers with 15 or more years of seniority —about 540. None of these are to be the 90 union leaders fired.

Prospects—The last negotiations held between Kohler and the CIO were in early August in Chicago. What's the outlook now?

Lyman Conger, Kohler negotiator, answers: "We're making no more overtures. We were told in July that the union wanted to settle, and the sessions were a waste of time."

Says Emil Mazey, secretary-treasurer of UAW: "We've made all the concessions we can. We're waiting for the outcome of the NLRB hearings. Until then, we're setting up a national campaign to persuade people to stop buying Kohler plumbing ware."

Top Card—Kohler appears to be holding the top hand currently. Management says 80 per cent of its work force has been restored by nonstriking personnel. It claims it's making a good profit and ended up in the black in 1954 despite the lost production.

Key to the outcome may be in the NLRB hearings. Board members admit proving failure to bargain in good faith is a tough one: "You've got to prove what management is thinking." If the regional board's decision holds and if the opinion is upheld should it go to the U. S. Circuit Court of Appeals, Kohler will be required to sit down at the bargaining table. When settlement comes, it would have to take back all the workers with the exception possibly of the 12.

If failure to bargain in good faith is not proved, the CIO's position will be precarious. Even with eventual settlement, less than 600 strikers would get their jobs back (if the company has restored 80 per cent of its work force with nonstriking personnel). A representation election then would probably go against the union.

Union Originally Demanded . . .

1. Union approval of all shop rules established.
2. Union approval of work schedules and work-hour changes.
3. Union approval of subcontracting policies.
4. Arbitration of everything except wages, job standards and rates.
5. Automatic wage progression with elimination of merit increases.
6. Superseniority for union officials and union stewards.
7. Strict seniority.
8. 20-cent, across-the-board raise, plus 10 cents an hour for skilled workers.
9. Other demands, including vacation increase, seventh paid holiday and noncontributory pension plan.

The Company Offered . . .

1. A 3-cent wage boost.
2. No strict seniority, but an improved plan over the former contract.
3. Leaves of absence for union officials.
4. No steward to be transferred involuntarily out of line of seniority.
5. Guarantee that working schedule would not be reduced below 32 hours per week for more than three weeks.
6. To renew the old contract without change for one year—including wages.

Children, not workers, will get the gifts when . . .

Santa Comes to Industry

COMPANY CHRISTMAS parties have taken on a new look.

The man behind the Santa Claus beard may be "Mr. Big" himself, but chances are he'll be handing out gifts to children instead of employees. It's part of a trend to bring the family into the fun.

Bring the Kids—Many industrialists, fearing the wrath of a disappointed army of 10-year-olds, ask professional organizers to make arrangements. Paid entertainments and expensive gifts highlight the party. More than one firm will spend as much as $10,000 for this year's merriment.

"The most popular dates are the two weekends preceding Christmas," says Organization Services Inc., Detroit, specialists in party planning for children. "For most effective building of good will, the party should be held in the plant," that organization adds.

Other Hints: Favored time for the party is Saturday afternoon. Presents should be divided into three or four age groups, and numerous adults should be present to control the rush at Santa.

Management is checking its Christmas list and cutting out some of the time-hallowed frills. Most firms agree that gifts to present or potential customers have little to do with buying policy.

More Changes—Another casualty is the traditional Christmas turkey. While a few firms maintain the custom of giving birds to workers at Christmas, most companies say it's impossible to hand them out fairly.

Santa will go easier on cash bonuses, too. Associated Industries of Cleveland reports a 10 per cent decrease in the number of firms giving bonuses between 1953 and 1955. Smaller companies still hold to the tradition, but growing competition and new tax laws cut down the financial gifts.

Christmas Spirits—They still flow at office parties, but the more boisterous celebrations have been driven underground. Practice is for individual groups to get together on their own to toast the holiday.

Children aren't the only ones who will find their stockings stuffed. A West Virginia firm confides that presents to its truck drivers result in quicker deliveries in the next few months. And there will be plenty of overtime at double pay. Demand for steel and many fabricated articles is too heavy to allow producers time to catch their breath.

Good Neighbors — Industry's generosity isn't limited to workers and their families. Rockwell Mfg. Co., Pittsburgh, is typical of a growing number of companies which give presents to children's hospitals and charitable institutions rather than customers.

For most office workers, Christmas, 1955, offers a much-needed, three-day rest after a prosperous, but hectic, year. The Mondays after Christmas and New Year's Day generally will be observed as holidays. They will give purchasing agents a respite in their search for wide-flange beams.

U. S. Steel Hits State Tax

U. S. Steel Corp. has registered a complaint with the Pennsylvania Senate Finance Committee concerning a proposed state manufacturers' excise and use tax.

The tax bill (H. B. 1879), currently before the senate, would mean that manufacturers would have to pay an extra price on equipment made in Pennsylvania.

U. S. Steel's comment is typical of many industrialists in the state. C. F. Hood, president, says: "We submit that a business located in the state must join with other parts of that economy in financing the cost of state government." But under the proposed tax manufacturers will be at a definite competitive disadvantage by reason of higher costs.

"In view of the present unbalanced Pennsylvania tax structure, we believe a retail sales and use tax is the fairest and best revenue source," Mr. Hood concluded.

Railroads Get Write-Offs

The railroads continue to get the benefit of fast tax write-offs on their freight car and other rolling stock programs. Of the latest batch of 43 certificates issued by the Office of Defense Mobilization, railroads get 20. Their value: $72 million; most of them are allowed at 85 per cent.

ODM says six of the certificates are for facilities involving small business. Other major permits were given for electrical generating plants and for research and development.

Lithium Weighs In

Suppliers predict increased demand for this lightweight metal whose low melting point and flexibility make it a natural for many industrial uses

LITHIUM, the lightest of all metals, is throwing its weight around.

Major lithium producers are big news on Wall Street, and a "Lithium Rush" is taking place in the U. S. and Canada. Production leaders have had to expand in recent years to overcome supply shortages and meet contemplated increases in demand.

Uses—Lithium is used as mineral, metal or as a constituent in compounds. Its long list of applications includes lubricants, ceramics, glass, metallurgy and welding. New, and relatively unexplored, is the field of organic-chemical synthesis (Grignard reactions).

A major consumer of compounds, and a growing one, is the porcelain enamel industry, where lithium is used to impart chemical durability and to lower firing temperatures required for nonwarping enamel application. This is particularly important now that porcelain enamel is receiving greater attention from architects as "curtain wall" finishes for buildings.

Metallurgy—Lithium appears to have a growing potential as an alloying constituent in the ferrous and nonferrous industries. Commercial acceptance has been retarded by economics, but the pricing trend seems to be more favorable.

Lithium salts are used in substantial quantities as fluxes for welding and brazing of aluminum. To some extent, the metal is used as an alloying agent for aluminum and magnesium, and it is used as a degasifier for nonferrous castings.

Greases—Multipurpose greases with a wide range of operating temperatures offer an expanding market—about 30 per cent of all greases made today are of this type. Next year, about 2 million lb of lithium hydroxide will go into multipurpose greases. Widely accepted in the automotive field, they are expected to make deep inroads in industrial lubrication.

Enthusiasm—Part of the furor about lithium comes from rumors that it may one day figure as a nuclear fuel. But the few nuclear experts who have commented on this say the use is still a question, not a fact.

Short-range possibilities clearly indicate the industry is not dealing strictly in futures. Foote Mineral Co., Philadelphia, the leading lithium producer, made the first important move toward expanding facilities in 1953 with its plant at Sunbright, Va. Lithium Corp. of America this year started a $7-million plant at Bessemer City, N. C. American Potash & Chemical Corp. expects to have its $6.6-million lithium plant at San Antonio, Tex., going by the first of next year.

Outlook—L. G. Bliss, senior vice president, Foote Mineral, probably sums up industry feeling when he says: "We're not optimistic enough to believe that existing commercial markets for lithium and its components can support contemplated production. We do believe, however, that the technology of lithium is young, and it will mature through the multiple efforts of those wedded to its future."

Foote Mineral Co.'s lithium processing plant, Sunbright, Va.

Farmers To Spend $24 Billion

Farmers will buy an estimated $24 billion worth of electrical appliances and equipment in the next 20 years, reports the Rural Electrification Administration.

A recent REA study points out that purchases in the next five years will come to about $5.3 billion; $11.3 billion in the ten years after that.

The survey is based on estimates that power requirements of REA-financed systems will nearly double by 1965 and triple by 1975. It assumes there will be no major changes in income, prices and technology. The number of farms, based on census definitions, will decline by 15 per cent in the next 20 years.

Lights and house wiring hold top place in estimated buys.

Household appliances, such as refrigerators, washing machines and television sets, follow closely. Electrical farm equipment comes farther down the list. Biggest items will be milk coolers and water pumps.

Top market area is California. Sales in that state for the next five years probably will reach $297 million. Tennessee, Iowa and Ohio follow.

Nickel Storm Brews

Platers assert famine comes from distribution patterns, not from shortage

DETROIT platers are buying as much as 75 per cent of their nickel at gray market prices—$3.50 a pound. Legitimate channels are getting 92 cents.

Adding up the cost for plating industry representatives at their recent Detroit meeting, John Palik, president of the National Association of Metal Finishers, figures that gray market nickel is costing automakers a minimum of $21 million this year. His maximum estimate—$98 million.

Inequities—Some platers keep going by passing along the cost, he says, while others have been forced out of business. He believes that the gray market covers one-third to three-quarters of total nickel requirements.

Platers believe that the shortage is to be blamed on distribution patterns rather than on lack of material. Dr. Kenneth A. Graham of Crowley & Associates Inc., Jenkintown, Pa., feels an investigation of the sources of gray market nickel would prove illuminating.

Suggestions—"Unfortunately our industry has inherited inequality of distribution from the Korean period," says Dr. Graham. "We receive a much lower percentage of our base period quantity than other nickel end-use industries."

Here are Dr. Graham's suggestions:

1. Dispel the idea that nickel plating isn't necessary and that platers have satisfactory substitutes.

2. Obtain a realistic re-evaluation of present-day requirements of all the nickel end-use industries, then re-allocate accordingly.

3. Organize all users of nickel plating to support the program.

The meeting of key plating representatives in Detroit was the first step. Step number two will come in Chicago in January, when representatives will meet a congressional leader. They'll be asking for government investigation of the allocation setup.

Experimental aluminum engine blocks roll as . . .

Detroit Waits for Results

ALUMINUM die-cast engine blocks are being produced experimentally. Doehler-Jarvis Division, National Lead Co., reports that its new aluminum, straight-type, 6-cylinder engine block weighs about 50 lb as it comes from the die-casting machine, 43 lb when trimmed. It is some 132 lb lighter than gray iron units.

What It Means—Aluminum engine blocks will sell for about 10 per cent less than gray iron units, says Frank J. Koegler, National Lead's vice president.

The new block is being produced on a die-casting machine capable of handling dies up to 50 tons. This machine and the aluminum engine block are a joint project of the Kaiser Aluminum & Chemical Corp. and National Lead.

Rundown—The aluminum blocks can be diecast at a rate of 30 to 35 per hour on a single machine. At this speed, some 1700 lb of molten aluminum are used each hour. All 129 holes are cored and cast to size—no holes have to be drilled in the block.

These experimental units now will undergo intensive testing. Based on experience with them, development of a V-8 aluminum engine block is getting under way. The V-8 will weigh 70 to 75 lb.

Head of Sharon Steel Resigns

Henry A. Roemer Jr. has resigned as president and director of Sharon Steel Corp., Sharon, Pa.

His father, Henry A. Roemer, will take over the duties of president and will continue to serve as chief executive officer, board chairman and chairman of the executive committee.

Parceling Out Prosperity

Extension of federal aid to depressed areas is in the cards. Some $50 million may be voted as a loan fund; technical assistance will be stepped up

CONGRESS has a sympathetic (and vote-minded) eye on the nation's "depressed" areas—parts of the country that are not sharing in the economic boom.

At last count (November) 19 of the nation's 149 major labor market areas had 6 per cent of the labor force unemployed. There were 74 smaller areas in the same boat.

Planned Action — What will be proposed in Congress next year is this:

1. Set up a new agency in the Commerce department. Suggested name: Federal Development Administration.

2. Provide about $3 million to give technical assistance to depressed areas. Basically, this phase of the program will be an extension of work currently being done by the Office of Area Development, Business & Defense Services Administration, Commerce department.

3. Set aside a fund of $50 million for loans to local industrial development groups. Federal participation in any loans, though, would be limited to about 25 per cent. Local groups will have to rely on their state government to get the rest. In fact, state participation will be a must before any federal loan will be granted.

Changes—The loan fund and the amount of funds available for technical assistance will be the big differences between the new agency and the present Office of Area Development (OAD).

OAD counsels industry on dispersal from prime target areas, assists communities in getting a development program started, helps firms find new products and new markets for products already made.

Co-ordinator—The office also coordinates information on federal aid and loan programs. It assists in the procurement of defense contracts for firms in surplus labor areas.

It helps get additional tax amortization benefits for expansion-goal defense facilities that will be in depressed areas.

The activities come under the heading of technical assistance. They would be expanded if the proposed program were approved.

Outlook—Chances for approval apparently are pretty good, even though Congress turned down an appropriation request (for fiscal 1956) to increase the Area Development budget from $120,000 to $370,000.

It's election year now, and the depressed areas are in 79 congressional districts (43 now held by Democrats, 36 by Republicans). Both sides have a vital interest in the program.

Meet Edward F. Lickey: Consultant to Metalworking Equipment Division, Business & Defense Services Administration, he's working on speeding up the government's "trigger" program for machine tools.

With Motch & Merryweather Machinery Co. for 37 years, Mr. Lickey managed the company's Detroit office for 15 years preceding his recent retirement. He may be contacted in Washington at Room 4015, Commerce Bldg. Phone: STerling 3-9200, ext. 597.

Here and There

More use of titanium in 1956—the government's planning on it. So the Business & Defense Services Administration has given producers a 90-day lead time to meet defense-rated orders.

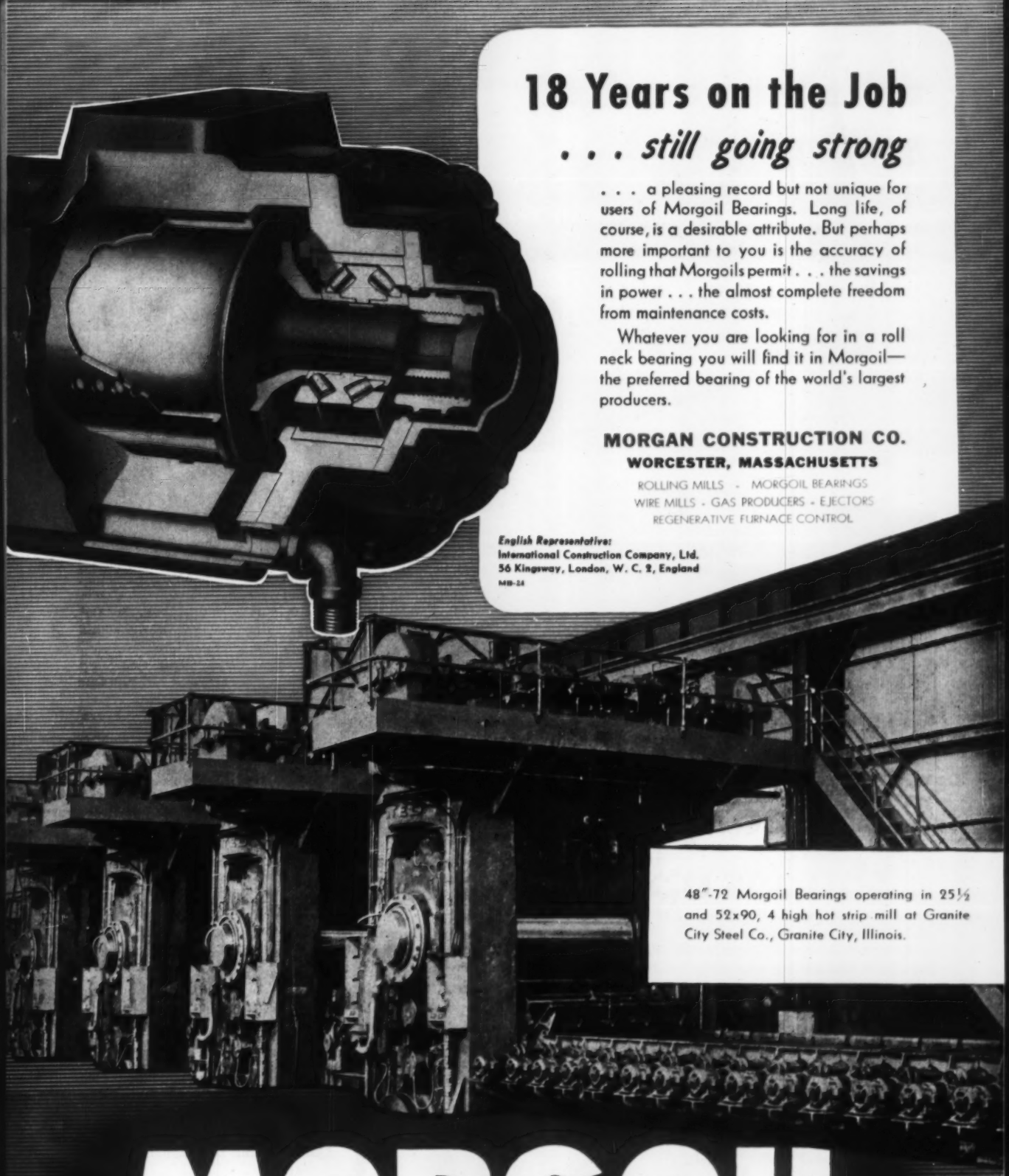
One of the big reasons for the action: Aircraft manufacturers haven't been giving enough lead time to suppliers of mill products; quality has suffered. In some cases, rush jobs were complete flops, and orders had to be rescheduled for future delivery because the first batch wasn't of high enough quality.

A side effect of the longer lead time is expected to be lower production costs, with eventual price reductions. Mills will be able to group small orders to be rolled at the same time and plan their ingot production better.

Fourth-quarter export applications for copper and aluminum scrap can be submitted up to Dec. 16, says the Bureau of Foreign Commerce.

Previously, BFC has required fourth-quarter applications to be filed before Dec. 1. The new ruling applies to new and old aluminum scrap and remelt ingots and to new and old copper and copper-base alloy scrap containing 40 per cent or more copper.

The Supreme Court is due to pass judgment on state right-to-work laws. Two test cases are coming up. The first is an AFL appeal against a Nebraska ruling that railroads cannot enter union shop agreements under the state law. This ruling declares that the Federal Railway Labor Act clause permitting union shops is unconstitutional in Nebraska. The second test will be an appeal from an opposite ruling by the North Carolina courts. If the Supreme Court upholds Nebraska, this ruling could be invalidated. Right-to-work laws are in effect in some 17 states.



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. . . *still going strong*

. . . a pleasing record but not unique for users of Morgoil Bearings. Long life, of course, is a desirable attribute. But perhaps more important to you is the accuracy of rolling that Morgoils permit . . . the savings in power . . . the almost complete freedom from maintenance costs.

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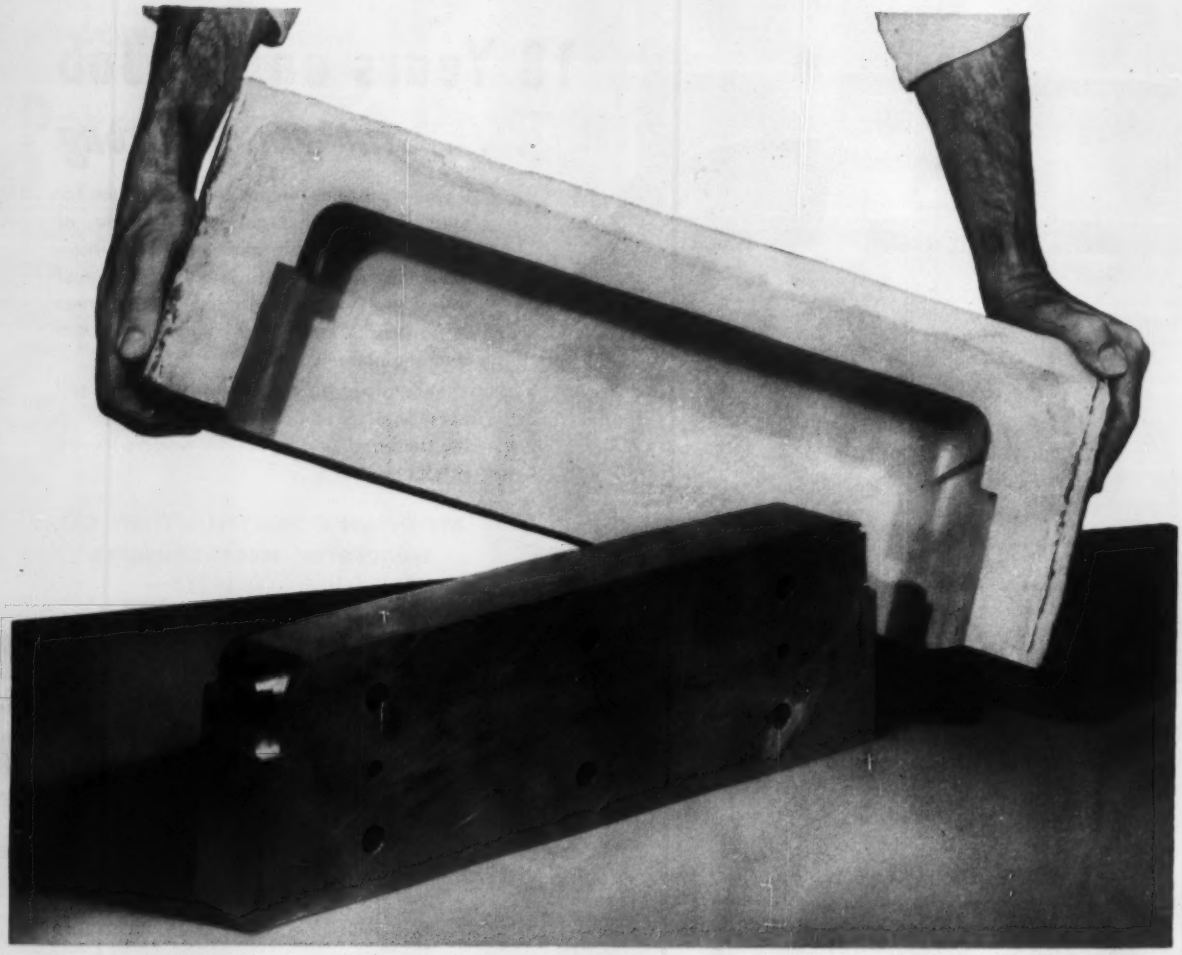
48"-72 Morgoil Bearings operating in 25½ and 52x90, 4 high hot strip mill at Granite City Steel Co., Granite City, Illinois.

MORGOIL
ROLL NECK BEARINGS



"Rezolin" Toolplastik Compound forms the concave die model shown here with the machined aluminum model around which it was cast. A "Keller" duplicator will be used to reproduce the plastic model in steel. This method saves five days, with an estimated 25 per cent reduction in production costs. Based on BAKELITE Epoxy Resins, this tooling compound is produced by **Rezolin, Inc., Los Angeles 25, Calif.**

Cast epoxy "Keller" Model shapes up 25% saving

Savings in toolmaking time often reach impressive percentages when compounds based on BAKELITE Brand Epoxy Resins are used. Here are some of the reasons:

- **Liquid compounds—can be cast to shape without pressure**
- **Cured at room temperature—no applied heat**
- **Minimum shrinkage—minimum finishing**
- **Excellent flexural, compression, and impact strength**
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- **Light weight means easy handling**
- **Laminated with glass cloth to form jigs, spotting racks, fixtures, and "Keller" models.**

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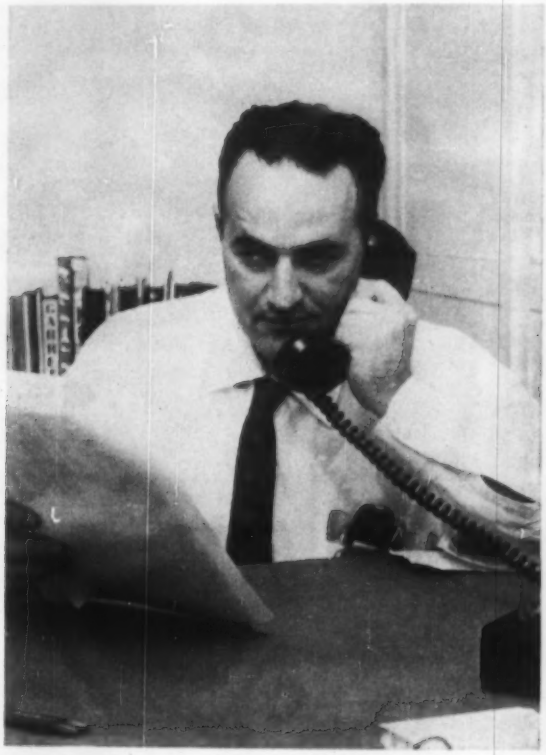


AiResearch's Young: Juggler of Parts

HOW DO YOU keep 14,000 kinds of parts for 1000 different products moving through the plant on schedule and without confusion? That's one of the jobs of Harris Young, factory manager, AiResearch Mfg. Co., division of Garrett Corp., Los Angeles.

To complicate the picture further, the products are sold to only one finicky customer, the aircraft industry. There's a demand for quality that he feels can't economically be purchased or subcontracted. It means AiResearch must continually add new processes to its plant—can seldom drop one. It also puts a new assembly into the works every other working day, takes one out of production at about the same rate.

A list of current products includes heat exchangers, electromechanical actuators, cabin pressure regulators, refrigeration systems and gas turbines.

Juggler—With parts and end products in a constant state of flux, he juggles schedules and facilities to maintain efficiency, avoid chaos. He has to take a host of widely diverse products, inherently costly, and insure his company a profit on the manufacture of all of them.

Part of the answer lies in delegating responsibility for quality widely. It goes beyond management and supervision to the operators. His is a business where it's economically sound to have a complete payroll of top-rate, skilled workers in every department.

Diversify—The big problem in being tied to aircraft, he feels, is that the cost of aircraft quality makes his company noncompetitive in other fields. Nevertheless, there must be an effort to diversify products to find new fields of application.

As an example, he cites some of the firm's air control systems which may find a niche in the chemical and petroleum industries.

A mechanical engineer from the University of Arkansas, his free time is spent with his family. A son, 12, and two daughters, 11 and 8, give him plenty to do. He's a Scoutmaster, a Cub Scoutmaster and a rabid manager of a Little League baseball team. He also shoots a "moderate" game of golf, scoring in the 80s. His home is in the Sherman Oaks section of the San Fernando Valley.

Modern French rolling mill helps boost steelmaking output

Boom in Europe—

France . . .

DESPITE the depressing effects of domestic politics and the difficult colonial situation, France is far from being the sick man of Europe.

Since 1938, industrial production has soared 70 per cent. It climbed 14 per cent in the last year. At $2 billion, France's foreign reserves have doubled since 1954. She has boosted ingot production 70 per cent since 1948. It will hit 13.5 million tons this year. Over the same period, U. S. ingot production went up 32 per cent.

Prop—Steel is a mainstay. By midyear, domestic steel orders had piled up to 90 per cent above 1953's levels; export orders were up 70 per cent. There has been little slackening. To meet the demand, ingot capacity will be boosted 550,000 tons each year until 1960. Rolling mill capacity will be hiked to 11.5 million tons a year.

Scrap prices are one of the major problems. In the last few months, they've jumped from $28 to $42 a ton. The full impact of this price squeeze is restricted to open-hearth steel, which amounts to only one-third of output.

Attitudes—On the surface, the automobile industry looks equally healthy. Output will be up 14 per cent from 1954, to 650,000 cars. But on many popular models, deliveries are extended two years. Yet two of the four major producers plan no large expansions.

Why? They say that France has one motor vehicle for every 14 inhabitants, maximum for present living standards. Colonial outlets promise to be more difficult to sell, and makers are not in love with the prospect of mixing it on equal terms with Britain, Germany and the U. S. for world markets. Although 33 per cent of cars on the road are of prewar vintage, automakers still don't feel more capacity is necessary.

Focus — Railroad car builders, confronted with semistatic demand, have inspired a new inter-European society to speed standardization and modernization of rolling stock. It will purchase equipment, then lease it to interested railroads. Car export is getting a play. New orders are beginning to roll in, notably from India and Pakistan.

Shipbuilding, too, is going well. Norway has ordered a 20,000-ton tanker and U. S. lines have placed several contracts, including one 52,650-ton tanker. By the end of September, shipyards had committed more than 1 million tons, with deliveries well into next year. The aircraft industry is another comer. It has been able to balance lack of capital against substantial offshore procurement from the U. S. Results: Know-how is up with the best. Sales competition will soon be felt in world markets.

Helping Hand—Sometimes eco-

nomic planning, Paris style, helps out. There are still 230,000 farms in France big enough to use tractors that don't have one. The government allows a one-third refund on all gasoline used on the farms. It also has authorized the return of one-third the purchase price of many types of farm equipment, tractors included. Results: Tractor sales should reach 45,000. In 1953 they were 29,000. Tractor production has jumped to 60,000 from a prewar 200.

Plant and equipment originally bought on reconstruction loans are being put to good use by the construction industry. A project for harnessing the tides is under way at Dinard, on the channel coast. An Alpine hydroelectric project is on its way to completion. Overseas, French construction firms have won contracts for an airfield at Hong Kong, for the Australian Snowy Mountain project, for a dam in Iraq, and for dams and bridges and steel plants in Venezuela, Colombia and Uruguay.

Outlook—This revival of industry is the most powerful cohesive force in France. Given time, it could bring new stability to the economy and then to politics. Under the influence of farm mechanization, the rift between peasant and worker is losing its sharpness, with the promise that France may soon be able to take full advantage of her potential balance between industry and agriculture.

Short-term, France's strategic position as supplier to a booming Europe assures her of continuing gains. She'll have to find new world markets as her colonial buyers dwindle.

Belgium . . .

BELGIUM enjoyed a record year, with most metalworking industries operating near capacity. Outlook: Continuing gains in 1956.

Steel production should hit 6.5 million tons, up almost 20 per cent from 1954. Production in the electrical industry is up 30 per cent, in the machinery industry, 27 per cent. Metalworking employment is up about 10 per cent from 1954.

Parallel—As in the U. S., Belgian economic gains have not been made without important concessions to labor. Prices have held remarkably steady over the last several years. But the first important breaks came in July and November, when steel and coke industries were struck. Next year, labor's demands must force price increases. Trades unions are shooting for a 45-hour week and wage hikes.

Pressure is increased because unemployment is at its lowest level in seven years. In the iron and steel industry, the schedule calls for gradual work-week reduction starting in February. Almost certainly, mills will be forced to counter with offers of substantial wage increases—their deliveries are extended as much as eight months on some products.

However, a recent merger between John Cockerill, Ougree-Marihaye and Ferblatil, concentrates 45 per cent of Belgium's steel capacity in one company, and the manufacturer's bargaining position will be improved.

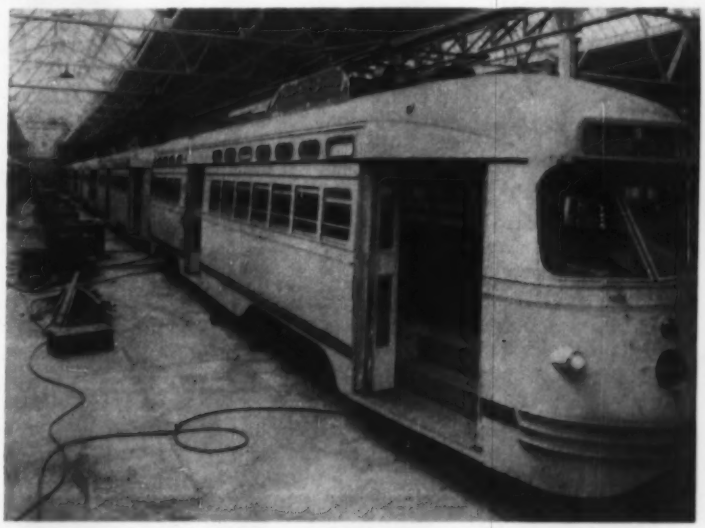
Exports—As much as any other European nation, Belgium depends on the export of manufactured products for her livelihood. Most metalworking industries have rung up good performances in 1955. Steel products are up 17 per cent over 1954; metalworking as a whole has gained 23 per cent.

Trade with the Netherlands is constantly increasing, with radio products and auto assemblies leading the way. Exports to France are up 40 per cent, notably owing to increased sales of galvanized sheet and tin plate. Other important factors have been the common market established by the European Steel and Coal Community, increased re-exports of military equipment and bigger French purchases of spare parts for machinery.

Markets—Belgium has enjoyed increased trade with West Germany, in special machinery, armaments and subcontracting. Trade with the United Kingdom also is up, consisting mainly of semifinished products and consumer goods. Trade with the U. S. has remained relatively stable, with volume business being done in glassmaking machinery, wire products and armaments.

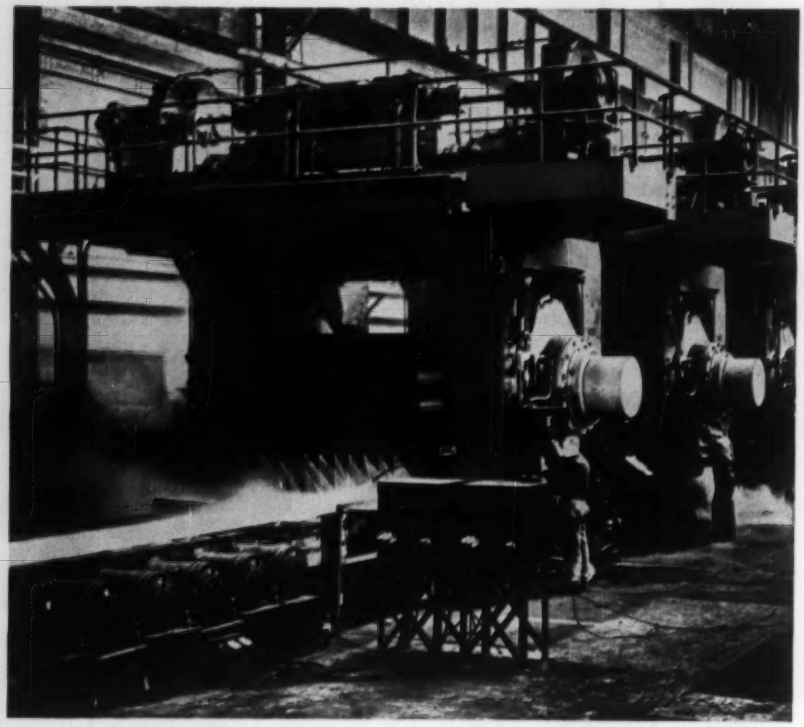
The concentration on overseas markets has paid off. Metalworking export sales are up to almost $500 million a year. In 1956, organized labor will be after its share of the prosperity. The big question: Can costs be kept down?

These articles continue a series on the economic outlook in major European countries. Next week we will cover England and Spain.

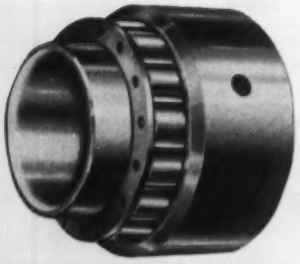


Passenger train gets tinsel touches in Belgian plant

HOW COSTS WILL COME DOWN IN YOUR PLANT



when you hand the heavy loads to HYATTS!



THINGS RUN SMOOTHER LONGER ON

Holding the line on production costs is one of management's highest-priority headaches today . . . and *here, again, is where HYATTS can help you!*

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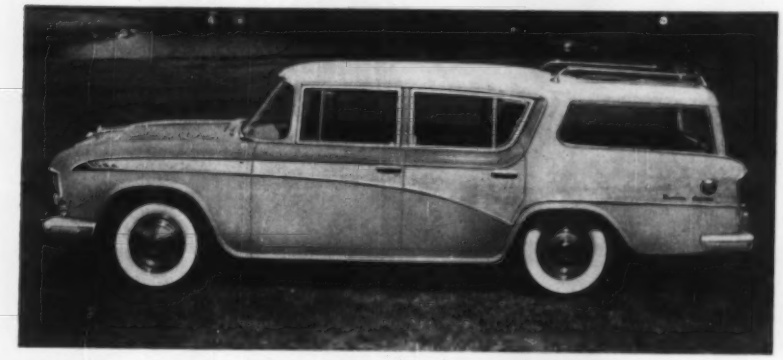
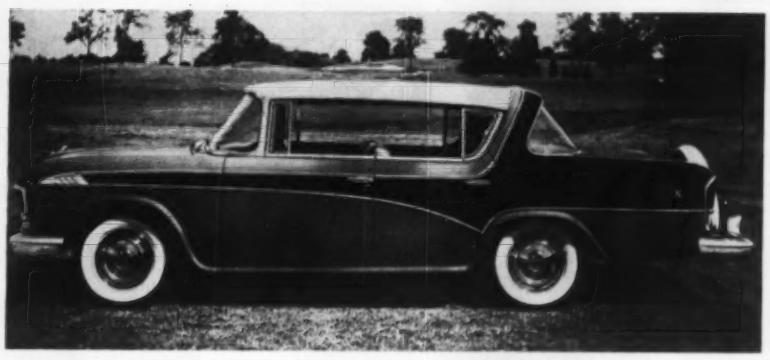


Ingenious touches like common side panels and . . .



Other economies on these two models show how . . .

AMC Counts on the Rambler

BACK in 1902, the Rambler was the forte of what has today become American Motors Corp.

Revived in 1950, the Rambler is again assuming a position of key significance in the future of its maker. But let's start at the beginning.

History—It was about 18 months ago, you may recall, that Nash and Hudson formed American Motors Corp. The move followed a sales slump in 1953 which found Nash dropping from 3.5 per cent of total sales to 2.2 per cent and Hudson from 1.7 per cent to 1.2 per cent. Both were losing dealers by the reduction. A major factor in the decision to merge was combining the dealer organizations.

But more significant still was the potential reduction in manufacturing costs. At the time of the merger, Nash had two bodies and Hudson had two, which added up to more than General Motors' three. One of the first benefits of the merger was the use of common tooling for Nash and Hudson bodies, with a resultant saving of $15 million in 1955 model tooling, according to George Romney, American Motors Corp. president.

Example — Manufacturing and assembly operations were largely concentrated in Wisconsin with considerable reduction in overhead costs. A good example is in forgings which Hudson was buying from outside suppliers prior to the merger. After the merger, the Nash forge shop, which had excess capacity, began making forgings for both lines of cars at a lower cost for each.

Writing off the expense of obsolete Hudson tooling, inventories and commitments against a merger reserve, coupled with other consolidation costs, threw the company into the red. But in the middle of February, the company moved into the black, and people who might have thought of the firm as vanishing American have begun to take a new look at the organization.

Rambler — Those who haven't been looking will be hit in the eye with the Rambler for 1956, one of the more interesting gambits in the auto game this year.

American Motors Corp. is strongly sold on the virtue of the basic volume car. Dedicated to the everlasting credit of the masses, this car, in the opinion of American Motors, is the key to success of the full-line producers. For American this car is the Rambler, and ultimately it is planned that the car will comprise a cornerstone of a broad line.

Longer—At the time the car was revived in 1950, the wheelbase was 100 in. The first Rambler on a 108-in. wheelbase was the four-door sedan introduced in 1954, and it is interesting to note that in 1956 models all are on the 108-in. wheelbase. Despite what appears a concession to social pressure, the Rambler is offered as an answer to the bulky car. Adroit styling has lowered the car 1¾-in. and reduced exterior width 2 in. Length has also been reduced 2 in. on some models.

But the remarkable thing is that this car appears conventional in size, compared with previous Ramblers which looked smaller. Moreover, this car with its smaller exterior dimensions is equal to the average Ford, Chevrolet and Plymouth in the composite of front and rear headroom, hiproom and shoulder room. Interior styling and appointments have been greatly improved and compare favorably with other cars in its field. And the air conditioning unit, previously

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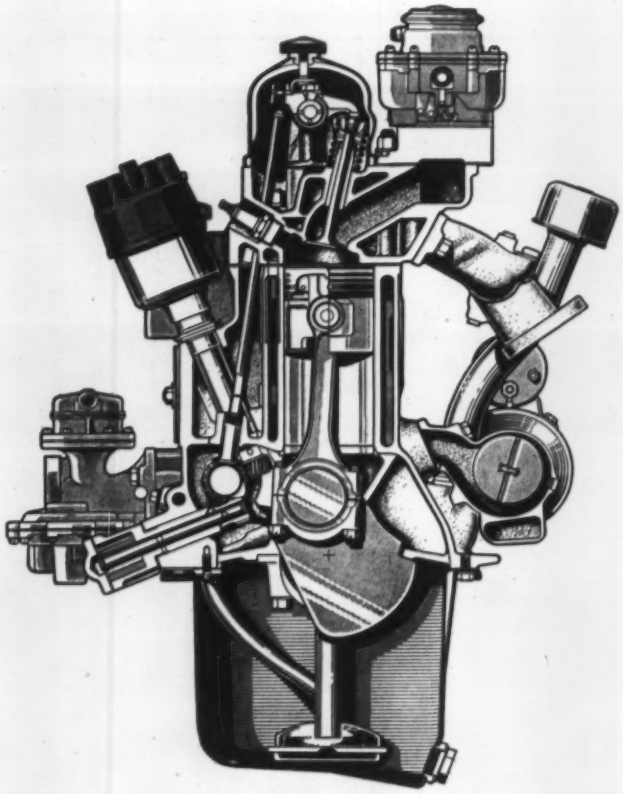
intruding into the legroom in the front, has been moved completely out of the way up under the cowl and on the firewall.

Test Drive — Perhaps the most outstanding feature to some, however, will come in test driving the Rambler. Distinguished by styling, which combines a roll-bar effect with excellent rearward visibility and unusual headroom in the rear seat, the practicality of the design must be experienced to be appreciated. Esthetic controversy to the side, this style treatment has definite functional advantages that mighty few style moves in recent years have been able to claim.

The Hotchkiss rear end has been replaced with a torque-tube drive which in combination with the unusual front suspension gives truly outstanding ride and bump recovery. And despite the use of relatively soft coil springs all around, the car displays impressive road holding and cornering characteristics.

Power — Acceleration with the new OHV engine is quite respectable, with 0-60 mph in about 14 seconds.

In connection with the engine, the term "new" is relatively accurate, but with some interesting history. As predicted, the unit is a conversion of the former L-head engine to OHV design. While a new block casting is employed and the distributor is shifted to the opposite side of the engine, machine tools formerly used in the production of the L-head design are retained in the new mode. This is possible, since fundamental dimensions like bore spacing, diameter, etc., have not been changed.



The Rambler has a new engine, too—this OHV unit

Economy—The head, of course, is entirely new and, with the exception of the surface broach, is being made in pretty much new equipment. But the result is that Rambler upped its power 30 per cent with what in principle is a new engine through only about a $2-million bill in tooling. The finished version turns out 120 brake horsepower compared with 90 bhp for the engine last year.

Another interesting bit of tooling sense is in the station wagon and sedan bodies. Both the hardtop and four-door version share sides in the sedan and station wagons. In other words, the four-door, hardtop convertible sedan and the four-door, hardtop convertible station wagon are built with a common side assembly. In the station wagon, the extended roof panel and wagon-type rear are welded on; while in the sedan, the conventional rear panels and deck are added.

Bargain — Total cost of the Rambler is pegged at $21 million. Included is an increase in output capacity of 60 per cent. Ramblers formerly built on the same final assembly line as the Hudsons and Nashes now have their own final line, with daily output pegged at 800 unts.

Supplementing the new final-line have been increases, particularly in Rambler body capacity, throughout the plant.

Demand?—That's to meet a demand expected to hit 150,000 in 1956. Dealers who had some reservations when George Romney predicted sales would double in 1955 over 1954 have seen the 35,000 sales of 1954 capped with 83,000 in 1955, up 130 per cent. And that was with a product only moderately changed over 1954's.

U. S. Auto Output

Passenger Only

	1955	1954
January	659,719	456,765
February	675,769	443,257
March	794,188	526,076
April	754,007	533,470
May	724,891	494,250
June	649,372	504,811
July	659,979	441,451
August	614,392	436,650
September	461,592	285,860
October	517,696†	236,635
November	748,559†	508,466
December		641,971
Total		5,518,662

Week Ended	1955	1954
Nov. 5	162,278	92,766
Nov. 12	180,754	116,285
Nov. 19	179,250	133,969
Nov. 26	151,799	111,910
Dec. 3	182,395†	144,995
Dec. 10	180,000*	148,692

†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*

FACTS

about

NEW DEPARTURE
BALL BEARINGS

New Departure split inner ring bearings are separable, facilitating cleaning, inspection and assembly into the engine. They carry heavy thrust loads from either direction and will also support major radial loads.

Research develops aircraft bearings for extreme speeds and temperatures

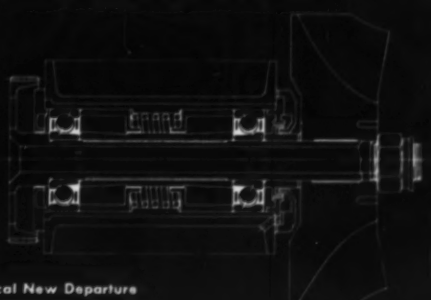
With jet aircraft flying higher and faster than ever before, ball bearings are being called on to meet increasingly severe conditions. For example, bearings that support the turbine wheels are subjected currently to temperatures up to 500° F. at high speeds and heavy thrust loads.

Anticipating still greater demands in the future, New Departure's Aircraft Research Program is already developing bearings for operational speeds of over 100,000 rpm and temperatures moving up towards 1000° F.

Typical of the bearings used in jet engines are New Departure's split inner ring types. These bearings are giving satisfactory performance in production engines today at extremely high speeds and heavy thrust loads. Write for full details.

TYPICAL JET AIRCRAFT APPLICATIONS

New Departure split inner ring bearing mounting for jet engine mainshaft



Typical New Departure ball bearing mounting for alternator drive power turbine

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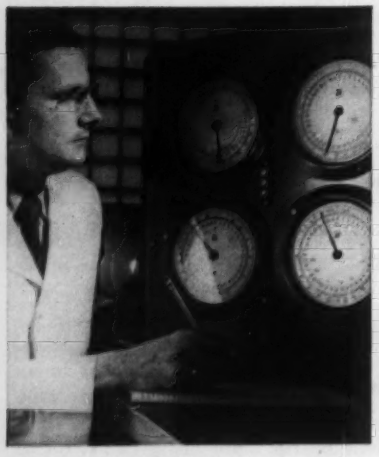

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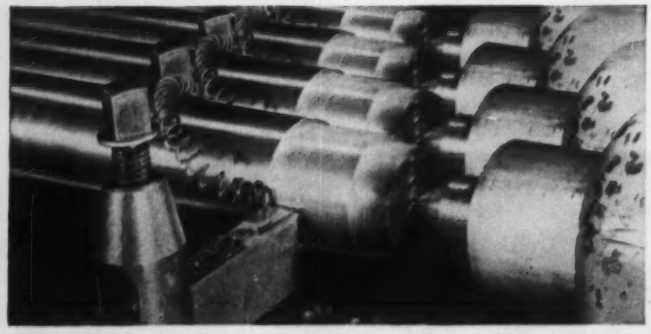

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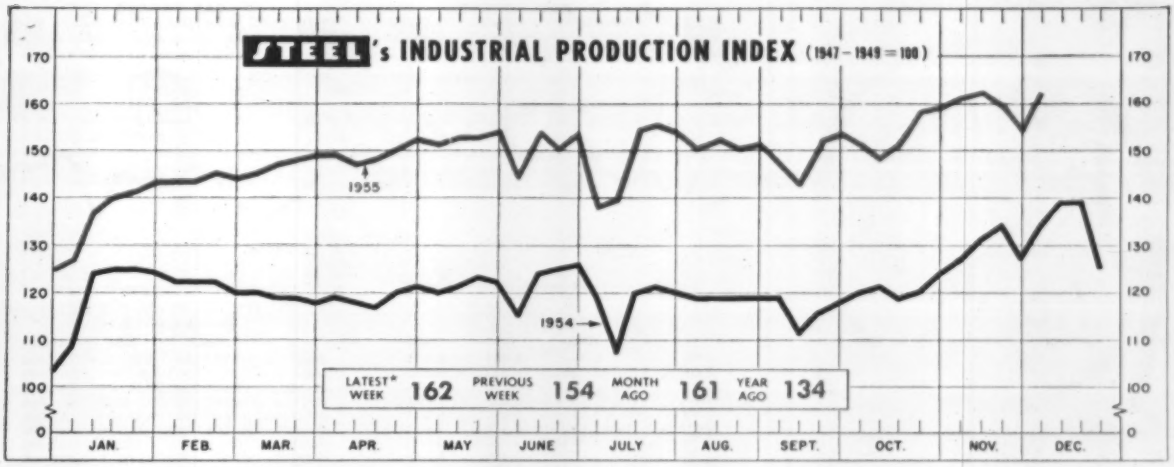
YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Dec. 3. Based upon and weighted as follows: Steel Output, 35%; Electric Power Output, 32%; Freight Car Loadings, 22%; and Auto Assemblies, 11%

Credit Curbs Won't Lower the Boom

BUSINESS is closing out the year with a rush and looking eagerly to 1956.

Credit restrictions won't dampen enthusiasm seriously; they may tone down spending enough to keep the boom going at a manageable pace.

Look Ahead — "Business volume at the beginning of 1956 will be running about 7 per cent higher than at the start of 1955, and current odds seem to favor a continued strong picture for the first half," asserts James M. Dawson, vice president and economist of Cleveland's National City Bank.

Mr. Dawson says that even if business eases in the second half, momentum from the first two quarters probably will make 1956 another record year.

Leveling Off — Credit will be slowing down in the next quarter though, as higher interest rates take effect. Loans currently outstanding indicate that the rate will still be strong, but new loans won't increase as much as they have.

Commercial and industrial loans have jumped almost $2 billion since June 30, this year. Latest Federal Reserve Bank reports show these loans at $28.8 billion. That's a $4.4 billion jump over this time last year.

Future Funds—A lot of this money is going to meet current business expenses, but some is earmarked for 1956 expansion plans—a sure sign that industry hasn't lost confidence in the future.

Consumer loans are up, too. Classified by the Federal Reserve System as "loans to individuals," this money, easy to get up to now, has jumped $630 million since June, to put it at $14.1 billion.

Discount Rates Up — Liberal credit rates have encouraged loans this year. But when the Federal Reserve Board of Governors upped the discount rate at its Cleveland and San Francisco banks from 2¼ to 2½-per cent (effective Nov. 18), borrowing slowed down.

Nonmember banks, and consequently, industrial and commer-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,384[1]	2,356	1,958
Electric Power Distributed (million kw-hr)	10,950[1]	10,727	9,087
Bitum. Coal Output (1000 tons)	9,025	10,200	7,432
Petroleum Production (daily avg—1000 bbl)	6,855[1]	6,859	6,270
Construction Volume (*ENR*—millions)	$278.8	$305.5	$302.8
Auto, Truck Output, U. S., Canada (*Ward's*)	217,701[1]	181,089	171,177
TRADE			
Freight Car Loadings (1000 cars)	770[1]	677	662
Business Failures (Dun & Bradstreet)	209	205	226
Currency in Circulation (millions)[3]	$30,962	$30,824	$30,504
Dept. Store Sales (changes from year ago)[3]	+10%	+6%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,984	$23,173	$18,502
Federal Gross Debt (billions)	$280,170	$279,814	$278,853
Bond Volume, NYSE (millions)	$17,978	$17,152	$25,618
Stocks Sales, NYSE (thousands of shares)	12,490	8,977	16,822
Loans and Investments (billions)[4]	$85,362	$85,781	$85,894
U. S. Govt. Obligations Held (billions)[4]	$29,962	$30,377	$37,411
PRICES			
STEEL's Finished Steel Price Index[5]	208.90	208.90	194.53
STEEL's Nonferrous Metal Price Index[6]	265.9	265.2	217.4
All Commodities[7]	110.1	111.1	109.5
Commodities Other than Farm & Foods[7]	119.2	119.2	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278; 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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Many of them buy their quality-stampings from us . . . and have done so for years!

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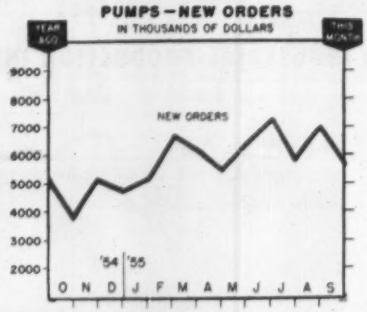
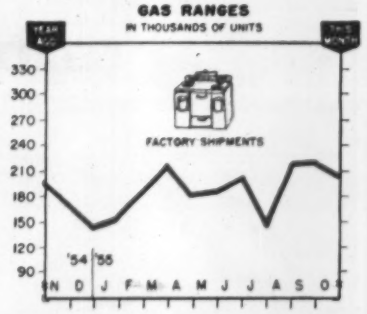


	1955	1954	1953
Jan.	5,220	4,057	5,752
Feb.	6,709	4,272	6,521
Mar.	6,161	5,093	8,255
Apr.	5,447	5,319	7,758
May	6,411	5,007	4,629
June	7,419	5,176	5,690
July	5,834	4,733	5,533
Aug.	7,022	6,706	4,886
Sept.	5,664	5,050	4,545
Oct.	....	3,828	5,097
Nov.	....	5,224	4,634
Dec.	....	4,787	4,645
Total	....	59,252	68,245

Hydraulic Institute



	Shipments—Units		
	1955	1954	1953
Jan.	152,900	137,000	169,200
Feb.	186,200	152,900	145,900
Mar.	217,300	188,200	208,200
Apr.	182,300	172,400	226,300
May	187,400	163,800	181,600
June	203,900	174,300	166,600
July	145,700	134,500	159,600
Aug.	218,600	179,400	186,500
Sept.	221,400*	203,900	209,500
Oct.	205,600*	197,100	203,900
Nov.	.....	174,000	158,500
Dec.	.....	147,300	134,400
Total	.....	2,024,800	2,183,300

Gas Appliance Mfrs. Assn.

*Preliminary

Charts copyrighted, 1955, STEEL

cial borrowers, now have to pay higher interest, with the result that loan activity will be slower starting into the new year.

Good Brake—Credit restrictions are helpful because more of next year's business will be done with earned, not borrowed, dollars. The big problem will be to maintain the delicate balance between tight credit, which would curb production, and overly liberal credit, which leads to inflation.

Mortgage Money Eases . . .

Not everyone is happy about the credit clamps. Many builders and real estate agents feel that credit restrictions have had an overly severe effect on the housing industry.

Charles Wellman, executive vice president of the Glendale (Calif.) Savings & Loan Association, told a Senate banking subcommittee: "Government efforts to bring the credit boom under control were badly timed. Restrictive steps were necessary, but they should have come earlier."

But some relief is in sight. Home loan banks probably will have more stand-by credit available shortly, says Walter W. McAllister, chairman of the Federal Home Loan Bank Board. This will help the building industry as it looks for a $44-billion year.

Retail Sales Hit Record . . .

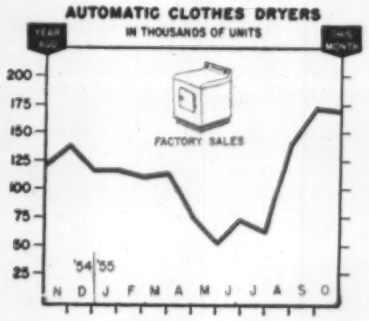
Confident consumers are boosting retail sales to an all-time high this year. Dollar volume is expected to reach close to $186.5 billion, 9.3 per cent above 1954 totals.

Christmas sales are indicative. Spurting along now, they probably will top last year's volume by 5 to 7 per cent. The reasons are obvious. Factory workers, for example, are making $6.50 more a week than they did last year. Employment is running at record high rates (65.2 million), and installment buying has had free run under a liberal credit policy.

This attitude won't change much in the first part of 1956. In fact, consumer spending will go up—maybe as much as $11 billion for the year. But the next few months should see a start toward less installment buying; more personal savings—especially if individual tax cuts do come true.

Skilled Help Wanted . . .

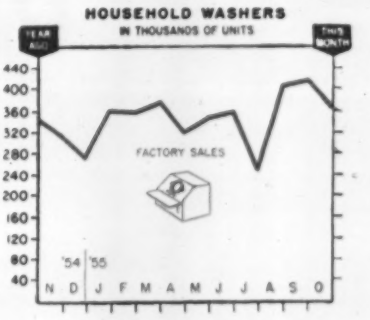
Next year will see a greater shortage of skilled labor as indus-



Factory Sales—Units

	1955	1954	1953
Jan.	357,354	249 956	277.309
Feb.	353.214	295.171	326 604
Mar.	370.555	307.862	345.989
Apr.	313.461	258.712	288.474
May	341.759	246.944	286.515
June	354.470	303.455	304.086
July	245.879	242.863	228.268
Aug.	403 770	293.243	291.260
Sept.	414.919	379.666	340.532
Oct.	362.335	339.169	310.867
Nov.	.....	308.368	238.153
Dec.	.....	264.803	191.570
Totals ...	.....	3.490.212	3.429.627

American Home Laundry Mfrs. Assn.



Factory Sales—Units

	1955	1954	1953
Jan.	115.383	82.195	62.260
Feb.	109.215	62.488	57 136
Mar.	113 498	54.796	49.593
Apr.	73.978	37.661	28.556
May	49.228	26.533	32.867
June	70.616	30.297	32.789
July	60 516	40.755	33 296
Aug.	36 190	80.165	70.774
Sept.	169.905	107.084	86 461
Oct.	166.889	122.182	81.839
Nov.	.....	138.254	78.167
Dec.	.....	115.341	82.730
Totals	.....	897.751	696.468

American Home Laundry Mfrs. Assn.

try continues to run at record rates.

Lower birth rates of depression years have caught up with the labor force, and there aren't enough trained men to go around. The current civilian labor force totals 67.3 million; only 2.1 million are unemployed.

A spokesman for Square D Co., Detroit, says: "There will be a continuing shortage of skilled workers." Chrysler Corp. reports a constant demand for 100 to 150 skilled workers over the last year.

First half of '56 most likely will see higher payrolls as skilled help puts in more overtime to meet production demands. It also means first and second quarter net profits may be slightly lower.

Replacement Parts Down . . .

The Automotive Parts Manufacturers Association reports its adjusted index of dollar sales of replacement parts is down 1.8 per cent in the third quarter, compared with second quarter of this year. Both quarters combined, however, exceed third quarter, 1948, a previous record.

Indications are that the fourth quarter will continue strong, but a downturn may be expected in the first quarter of '56 as high automobile sales of the last two years start eliminating the immediate need for repair parts.

Trucks have come in for some comments in the automotive field, too. *Ward's Automotive Reports* claims that independent truck producers have boosted dollar sales, but have failed to widen their bite of the domestic truck market.

With the growing need for commercial transportation, next year should see more trucks produced by Big Three makers, as well as smaller companies. Much of the output is expected to be in heavy-duty trucks.

Trends Fore and Aft . . .

Prudential Insurance Co. of America economists predict 1956 will see an increase of $3 billion in business capital spending; $13 billion rise in personal income . . . Salvatore Giordano, president of Fedders-Quigan Corp., Buffalo, N. Y., (air conditioners) claims: "There's room for sales of 1-million room units in the near future." . . . Scott-Atwater Mfg. Co. Inc., Minneapolis, reports a record smashing year for outboard motor sales. Third quarter shipments increased 255 per cent over a similar period last year.

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MIDDLETOWN, OHIO

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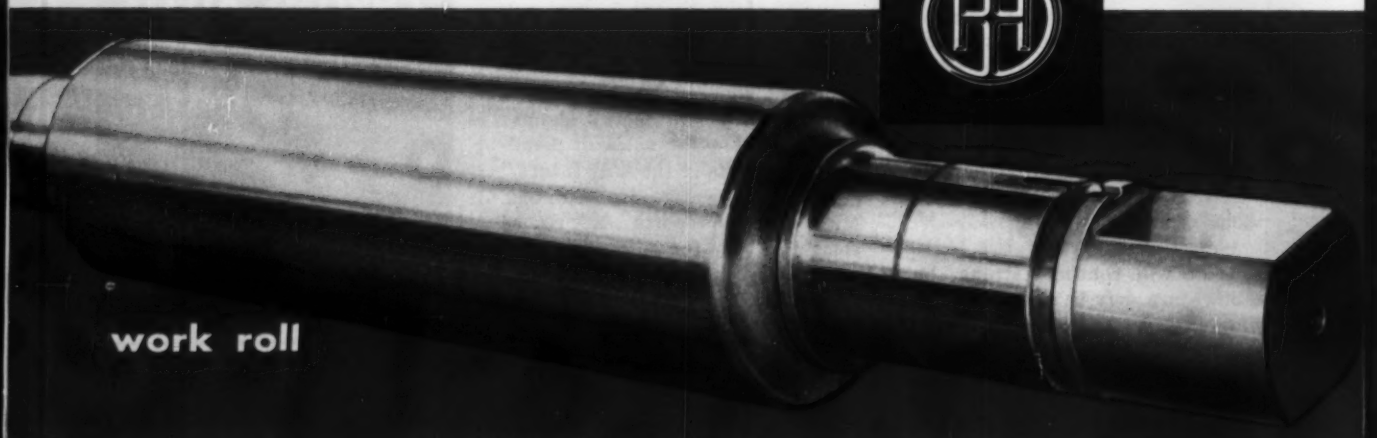
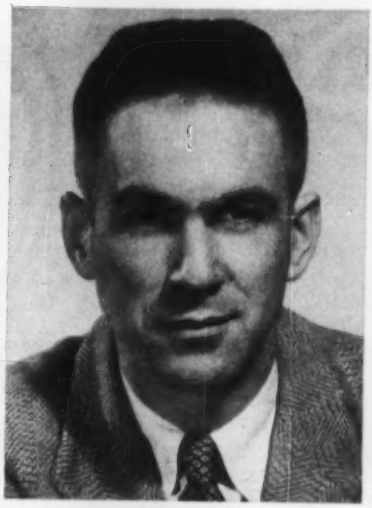


work roll

CHARLES E. RICE
. . . Jessop Steel executive v. p.



DONALD R. SCHOEN
. . . manager of the Hays division

GEORGE A. TIERNEY
. . . McAleenan Bros. general mgr.

Jessop Steel Co., Washington, Pa., elected **Charles E. Rice** executive vice president. Mr. Rice is also president of Jessop Steel of Canada Ltd. and vice president of Jessop Steel International Corp., subsidiaries. He has been vice president-sales for Jessop Steel for five years, and continues sales direction in addition to administrative responsibilities.

W. C. Whitehead, executive vice president, was elected president of **Garrett Corp.**, Los Angeles. **J. C. Garrett,** president and founder of the firm, was elected chairman of the board.

Paul R. Minich Jr. was made general sales manager, materials handling division, **Yale & Towne Mfg. Co.**, at Philadelphia. Formerly a Yale representative, he was president of Materials Handling Products Corp., with offices in Syracuse and Albany, N. Y. **Joseph J. Murray** was named to a new post, assistant general sales manager for the division.

Chris J. Witting, recently made general manager of consumer products, was elected a vice president of **Westinghouse Electric Corp.**, Pittsburgh. He is in charge of the consumer product divisions.

R. G. Foster was elected president of **Marshall Engineering Co.**, Santa Monica, Calif.

Donald R. Schoen, vice president-manufacturing, **Hays Corp.**, Michigan City, Ind., was named manager of the Hays division. Vice President **Robert E. Navin,** who is in charge of engineering, also was named manager of the Metrotype division.

A. M. Thompson was made manager of **Fabriform Metal Products,** Los Angeles, division of George Getz Corp. He continues to handle sales and advertising.

Morris L. Hutchens was made chief engineer at **Kearney & Trecker Corp.**, Milwaukee. He succeeds **Orrin W. Barker,** recently named vice president in charge of engineering. **Andrew K. Wilson** fills the new post of vice president-industrial relations.

Ray E. Eisenbies was named president of **Sawhill Tubular Products Co.**, Sharon, Pa. He succeeds **Don Sawhill,** now chairman of the board, who had held both positions.

Fred P. Schliebner was named manager, quality control, Herbrand Division, **Bingham-Herbrand Corp.**, at Fremont, O. He replaces **G. H. Fromer,** now factory manager of the division. Mr. Schliebner formerly was with the Willys-Overland Forge Division and Spicer Division of Dana Corp.

George A. Tierney succeeds **Charles Hoyt** as general manager of **McAleenan Bros. Co.**, Pittsburgh. **Joseph L. Haley** was made director of sales engineering.

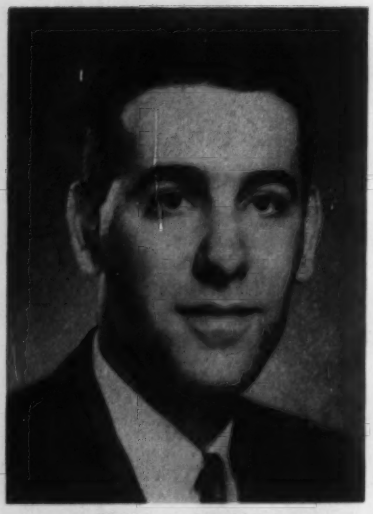
Harold N. Lang was appointed general manager of **Wheeling Steel Corp.'s** Benwood, W. Va., Works. He succeeds **Paul W. Koenemund** who was made chief engineer of the corporation.

W. W. Stewart was made assistant to the president, **Industrial Fasteners Division,** Oliver Iron & Steel Corp., Pittsburgh. **John H. Fulford Jr.** was appointed district sales manager in Ohio and **Kenneth A. Yaeger** sales representative.

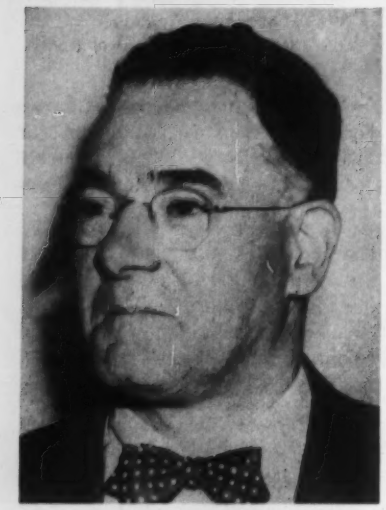
Harry D. Myers has become associated with **Towner Mfg. Co.**, Santa Ana, Calif., as a partner and general manager of operations. He was president of Cloyes Gear Works, Cleveland, and previously served in executive positions with Thompson Products Inc., Harry Ferguson Inc. and Standard Products Co.

Russell B. McNeill was elected vice president of administration at **Houdaille Industries Inc.**, Buffalo. Houdaille-Hershey Corp. was renamed Houdaille Industries Inc. on Nov. 30.

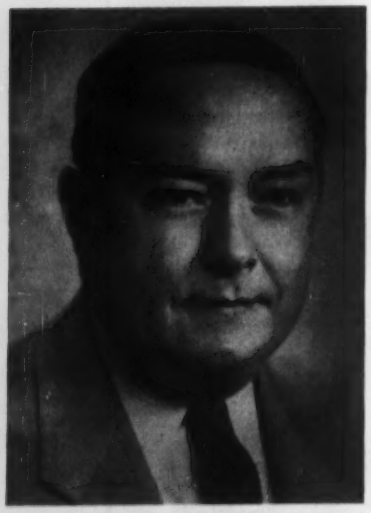
Philip F. Hartung was made east-



SETRAK K. DERDERIAN
. . . vice president of Metal Hydrides



JEFF H. HOWELL
. . . supt. at Republic's Warren, O., plant



GEORGE R. ANDERSON
. . . Weatherhead industrial equipment sales

ern regional sales manager of **Rigidized Metals Corp.** He is at Bergenfield, N. J.

Robert J. Niederhauser was named to a new post of manager-sales engineering for **Harris-Seybold Co.**, Cleveland. Associated with the company for 16 years, he has been lithographic product manager since 1953.

Setrak K. Derderian, general manager, was elected vice president of **Metal Hydrides Inc.**, Beverly, Mass.

Donald W. Games was made sales engineer for **Production Machinery Corp.**, Mentor, O. He was a project engineer with Wean Equipment Corp.

Jerry T. Atkinson was elected president and general manager of **Alloy Products Corp.**, Waukesha, Wis., to succeed the late **W. J. Wachowitz Sr. Walter J. Wachowitz Jr.** was named vice president and general sales manager. **Earle W. Hardy** was elected secretary, **Walter A. Sherman**, treasurer.

Edward G. Merk was elected vice president - sales at **Benchmaster Mfg. Co.**, Gardena, Calif.

Jeff H. Howell was made superintendent of hot strip finishing at the Warren, O., steel plant of **Republic Steel Corp. A. F. Prust** was named chief metallurgist.

R. W. Johnson and **Irving C. Maust** were elected vice presidents of **Foote Bros. Gear & Machine Corp.**, Chicago. Mr. Johnson is sales director for the industrial gear division. Mr. Maust is sales director for the precision gear division.

Thomas Linder Jr. was appointed manufacturing manager, **Chandler-Evans Division**, Pratt & Whitney Co. Inc., West Hartford, Conn.

George R. Anderson was appointed sales manager for original industrial equipment at **Weatherhead Co.** He will have headquarters in the newly established division general offices at Ft. Wayne, Ind.

General Electric Co. named **Howard M. Perry** manager-product services and **F. C. Miller** manager-marine sales in its small turbine and supercharger department at Fitchburg, Mass. Mr. Perry replaces **John H. Reynolds Jr.**, now manager - services engineering practices, installation and service engineering department at Schenectady, N. Y.

Taylor-Wharton Iron & Steel Co., division of Harrisburg Steel Corp., High Bridge, N. J., appointed **Carl A. Read Jr.** as sales engineer in charge of its New England territory.

Charles H. Luikart was made assistant district sales manager, Cleveland district office, **Kaiser Aluminum & Chemical Sales Inc.** He was manager of the Boston branch.

Tom Pearson was made manager of the Houston district office of **Lone Star Steel Co.** He succeeds **B. C. Robertson**, now manager of the firm's oil country goods sales.

E. W. Bliss Co., Salem, O., appointed **Edmund Shuster** chief European sales engineer, rolling mill division, to replace the late **D. H. Montgomery.** From headquarters at the Bliss French subsidiary in Paris, he will direct sales and service engineering for rolling mills and allied equipment, as well as mill rolls and tube straighteners for Bliss' Mackintosh-Hemphill Division.

Glenn H. Parker was made district sales manager in northern New York state for Republic Steel Corp.'s **Berger Division.** He is in Albany.

Willard F. Bierman was made manager of sales and engineering of **Madison Industries Inc.**, Big Rapids, Mich. He was chief engineer of Madison Mfg. Co. at Muskegon, Mich.

Charles T. Schwarz was made Chicago branch sales manager by **Yale & Towne Mfg. Co.** He replaces **Roy L. Wolter**, recently made general manager of Yale & Towne's Automatic Transportation Division, Chicago.

H. H. Butts was appointed sales engineer for the Chicago area by **International Rustproof Corp.**

Edgar W. Engle was made techni-

Using the Sheffield-Cavitron Ultrasonic Machine Tool to dice germanium in the mass production of transistors. The tool itself consists of 271 pieces of Superior's 18-gage Type 304 needle tubing, cut to 7/8" lengths and silver brazed into a single tool, permitting tolerances as fine as .0005".

NEW ULTRASONIC MACHINE TOOL USES TUBING TO CUT HARDEST, MOST BRITTLE MATERIALS KNOWN

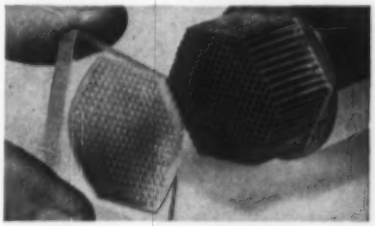
a new application for Superior Tubing

Ultrasonic vibrations do the cutting with this new machine tool, invented and developed by the Cavitron Equipment Corporation, Long Island City, N.Y. In the Cavitron process, a tool is used which has the precise shape of the cavity desired. Finely divided abrasive particles suspended in water are flowed continuously across the work. No movement or vibration is visible when the machine is switched on, although the tool tip vibrates 20,000 times a second through a stroke of .0035". The vibrating tip activates the suspended particles, and microscopic chips are gently excavated without heat, noise or vibration. The tool sinks swiftly into the work under slight pressure, forming a cut or cavity of exactly the same shape as the tip.

Tools made of Superior tubing save considerable cutting time on relatively large areas. Furthermore, the slender walls (.005" thick) minimize waste of valuable raw material. Cavitron engineers first used carbon tubing for this purpose, but in consultation with Superior engineers switched to AISI Type 304. This material has twice the life of carbon tubing, with much greater resistance to wear. Most important, it resists warping at the silver brazing temperatures needed to join the tubes together.

Your files should contain Superior Bulletin No. 40. It lists over 55 types of available material, including the stainless steels, with valuable selection and application data. Write for your free copy today. SUPERIOR TUBE COMPANY, 2005 Germantown Ave., Norristown, Pa. *On the West Coast:* Pacific Tube Co., 5710 Smithway St., Los Angeles 22, California.

Superior tubes are cut into 2" lengths and silver brazed into a 6-sided tool, which is then cut in half and two complete honeycomblike tools formed—each 7/8" deep. Similar tools are used to cut precision jewel bearings.



Closeup of tool and work shown in top picture. The Cavitron makes it possible to cut and drill intricate shapes in materials which, because of their frangibility or sensitivity to sudden temperature changes, would be impossible to work on a production basis.

All analyses available in .010" to 1/4" OD; certain analyses in light walls up to 2 1/2" OD

Superior Tube
The big name in small tubing

MARVIN L. STARK
. . . Peerless Mfg. vice president

J. R. FERGUSON JR.
. . . U. S. Steel asst. v. p.-engineering

WARD W. CLARKE
. . . S. P. Kinney Engineers v. p.

cal director of **Vascoloy-Ramet Corp.**, Waukegan, Ill.

Marvin L. Stark was elected vice president, engineering and development, **Peerless Mfg. Corp.**, Louisville. He was director of engineering.

Roger A. Nagan succeeds **Earl F. Lowe Jr.** as superintendent of coke ovens for **Interlake Iron Corp.'s** Duluth plant.

Allis-Chalmers Mfg. Co., Milwaukee, appointed **J. D. Harmison** parts sales manager for the tractor group. He is succeeded by **Frank Jones** as tractor sales manager, farm equipment division.

George W. Herman was made assistant plant manager at Bridgeport, Conn., for **American Chain & Cable Co. Inc.**

J. R. Ferguson Jr. was appointed an assistant vice president-engineering, **United States Steel Corp.**, Pittsburgh. He is succeeded as chief engineer-project development by **P. S. Weaver.**

Howard L. Young was elected a vice president of **American Zinc, Lead & Smelting Co.**, St. Louis. He was appointed vice president of American Zinc Sales Co., subsidiary, in 1954.

J. P. Cody was made manager, industrial division, **J. I. Case Co.**, Racine, Wis. He succeeds **George W. Iverson**, retired.

Frederick C. Borel III joined **Arthur G. McKee & Co.**, Cleveland, as sales engineer in the industrial engineering division. He held a similar position with H. K. Ferguson & Co.

Ward W. Clarke was elected vice president in charge of engineering at **S. P. Kinney Engineers Inc.**, Carnegie, Pa. He is succeeded as chief engineer by **Hugh B. Carr**, formerly associated with Steel Co. of Canada Ltd.

John F. Karr was appointed manager of market research by **Trane Co.**, La Crosse, Wis.

Robert F. Schutz was promoted from manager to vice president and manager of **Borg - Warner Corp.'s** Ingersoll Kalamazoo, Mich., division.

Richard Smucker was made project engineer with **E. W. Bliss Co.'s** rolling mill division, Canton, O. He was an engineer in the Salem, O., plant. **Tom A. York** was made sales engineer of the press division in the Rochester, N. Y., territory.

OBITUARIES . . .

William A. Peterman, 73, vice president and general manager, **Galand-Henning Mfg. Co.**, Milwaukee, died Nov. 26.

William C. Epstein Sr., 63, general manager, **Miami Foundry Co.**, Miamisburg, O., died Nov. 24.

Alexander Primas, 59, former owner of **Primas Tool & Die Shop**, Buffalo, died Nov. 22.

David N. Hughes, 84, former general superintendent, **Baldwin Locomotive Works'** Eddystone, Pa., locomotive division, died Nov. 15.

Frank K. Metzger, 64, former vice president and general manager, **Standard Steel Works Co.**, Burnham, Pa., subsidiary of Baldwin Locomotive Works, died Nov. 17.

Joseph H. Sherman, 52, vice president and treasurer, **A. Sherman Mfg. Co.**, Stamford, Conn., died Nov. 23.

Robert S. Andrews, 61, president of **Monarch Laboratories**, Utica, N. Y., died Nov. 18.

Allen E. Chester, 54, vice president, **Promat Division**, Poor & Co., Waukegan, Ill., died Nov. 20 while en route to Honolulu.

Ralph J. Knerr, superintendent, alloy and tool steel division, Bethlehem, Pa., plant of **Bethlehem Steel Co.**, died Nov. 23.

John J. Carson, 41, owner of **Carson Metal Products Inc.**, Unionville, Conn., died Nov. 24.

AIR engineering at work
REPORT No. 4271.10

Slugger "Pinch-hits" for Battering Ram...

SAVES $13,000...

Six men spent 21 hours removing nuts from 54 five-inch diameter bolts on this hydro-generator rebuilding job. An 800 lb. battering ram was used to remove the nuts, which held three drive shaft couplings together between water wheel and generator.

It took seven men another 24 hours to tighten the same nuts with the battering ram. Down time on the generator cost $300 per hour. The problem was how to run the nuts faster and with less manpower.

AIR engineering was put to work. A Size 588 Slugger Impactool "pinch-hit" for the battering ram. Two men then removed all the nuts in 1¾ hours, and put them on again in 2 hours, saving 286½ manhours and 41¼ hours down time. With nearly $13,000 saved on its first job, the Slugger now has a "full-time" job.

AIR engineering Manual

Over 100 interesting and helpful case history applications of AIR engineering at work.

If you in any way influence production or maintenance cost-savings in your plant, it will pay you to see I-R's confidential manual of reports on "AIR engineering at work". Write on your company letterhead, and we'll make arrangements for you to see it soon.

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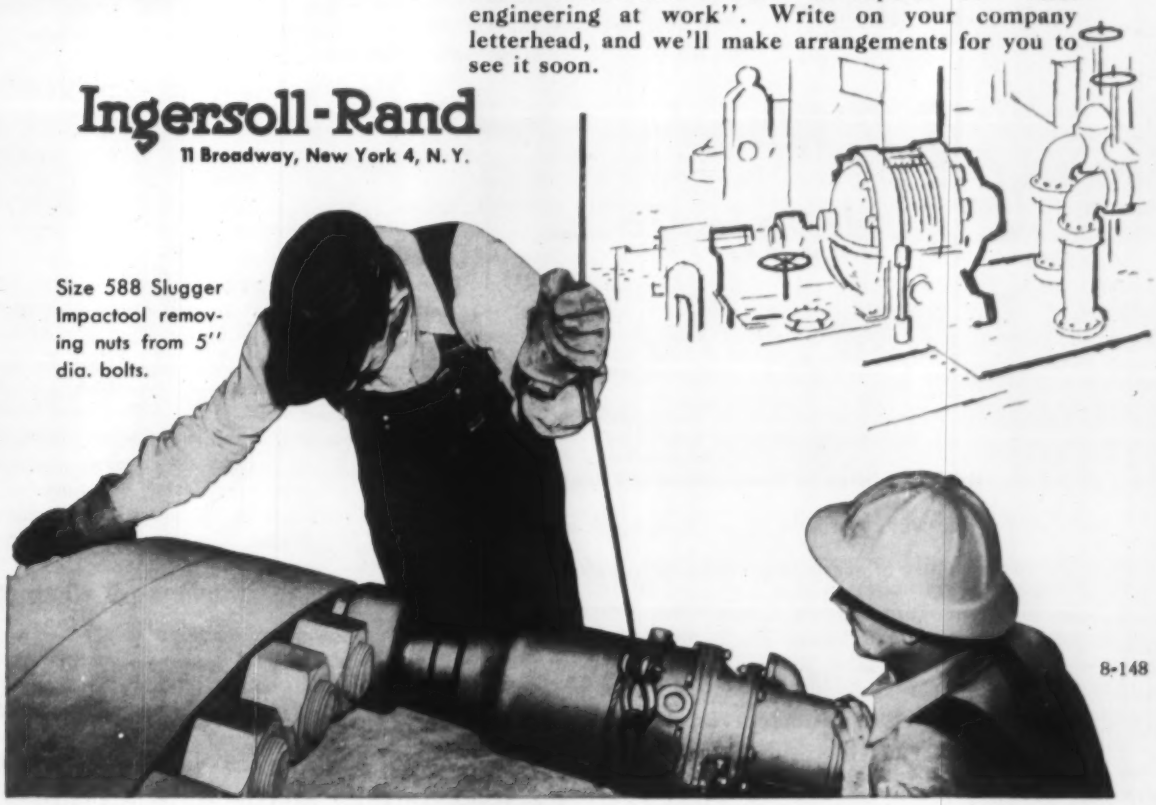
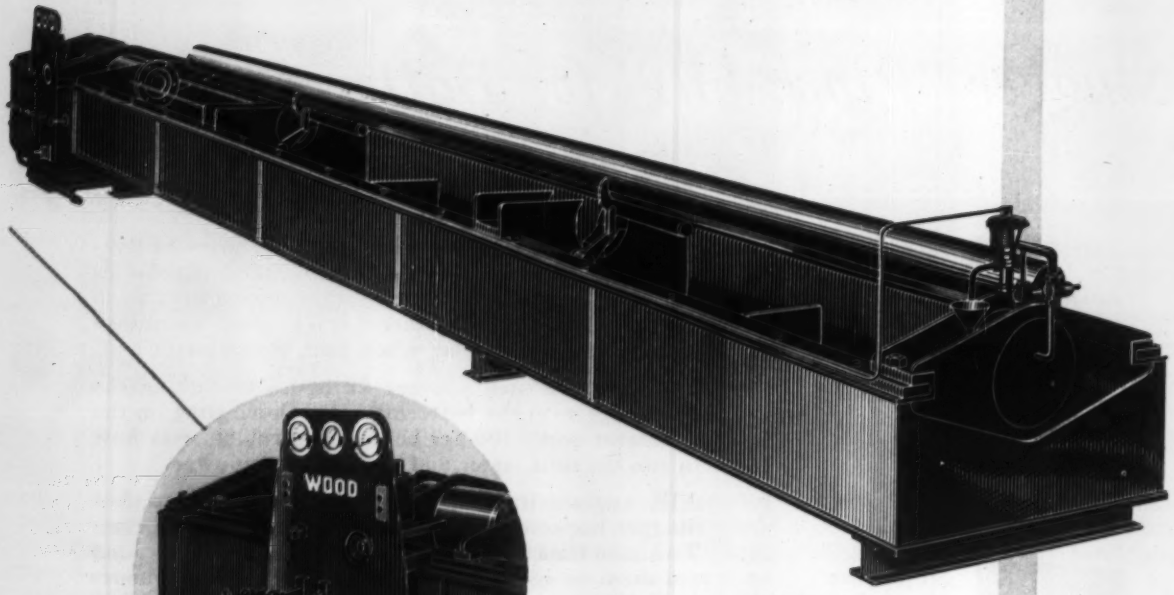
11 Broadway, New York 4, N. Y.



Size 588 Slugger Impactool removing nuts from 5" dia. bolts.

8-148



Hydrostatic Tube Testing Machine designed for the hydrostatic testing of tubes of 4½" to 12" nominal sizes and in maximum lengths of 35'. Test pressures range from 700 to 1500 psi. *Write for catalogs of our hydraulic equipment.*

R.D. Wood Hydrostatic Tube Tester

"... that industrial equipment which has maintained high excellence in manufacture will continue to be sold, and will contribute its worth to uplifting the general quality of everything produced in industrial America ..."

R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING, PHILADELPHIA 5, PA.

WOOD

HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE • ACCUMULATORS • ALLEVIATORS • INTENSIFIERS

Foundry Expands

Multimillion program at Central's Alabama plant includes addition of continuous casting machinery

CENTRAL Foundry Co., Newark, N. J., is spending $2 million for further mechanization and expansion of its plant at Holt, Ala. Including this project, the company has spent $7.5 million for improvements since World War II, says J. J. Nolan Jr., president.

The new program calls for the addition of continuous casting machinery for 2 and 3-in. cast iron soil pipe. Other expenditures will be for further mechanization of manufacturing processes and materials handling.

Outstanding among the earlier improvements are: Origination of the centrifugal method (Nolan process) for making cast iron soil pipe; a new foundry exclusively for producing machine-made soil fittings; and a new plant for manufacturing fiber pipe, the latest product added to its line.

Plant facilities at Holt now consist of six foundries and 15 auxiliary plants for utility services, production, research and storage.

Detroit Valve Co. Formed

Anderson Brass Co., Detroit, acquired part of the assets of the Brass Division, Detroit Brass & Malleable Co., that city, producer of gas cocks, valves and fittings for appliances. The property will be used to form the nucleus of a new company, Detroit Valve Co., which will be operated as a wholly owned division of Anderson Brass. R. C. Anderson is president of both companies. E. R. Anderson is executive vice president and assistant general manager. E. E. Anderson is vice president in charge of all production and purchasing of the two companies.

Atrax Co. Expanding

Atrax Co. is adding more space and equipment at its Newington, Conn., plant. The firm is adding 2000 sq ft of plant area and is increasing its special service facilities. The company makes solid tungsten carbide tools.

"Torture" Chamber Knocks "Whiskers" Off Nails

The iron maiden of medieval days had nothing on this torture chamber which is getting finishing touches at U. S. Steel's Johnstown, Pa., Works. This 8000-lb device removes the finlike formations on newly made nails before being packed for shipment. The "whiskers" fall through the small holes in the cylinder as it rotates to condition the nails for final cleaning and polishing

Vitro To Build Laboratory

Vitro Laboratories, a division of Vitro Corp. of America, New York, will build a $1-million laboratory near Silver Springs, Md., to replace leased facilities in that city. Vitro Corp. mines, processes and refines uranium; recovers rare metals; does chemical and physical research; develops processes, instrument and equipment systems; operates test facilities; manufactures ceramic colors and chemicals; designs and engineers processing and manufacturing plants and other technical facilities.

Ford Starts Plant Project

Ford Motor Co., Dearborn, Mich., has started construction of an automatic transmission plant in Sharonville, O., near Cincinnati (see STEEL, July 4, p. 64). Construction is expected to be completed by January, 1957, while production is scheduled to begin during the latter part of that year. This plant, part of Ford's $3,750,000,000 postwar expansion, modernization and tooling program, will not affect current company automatic transmission production at the division's other facility in Fairfax Village (an eastern suburb of Cincinnati), or at the division's headquarters plant at Livonia, Mich.

Punch Press Firm Expands

Kenco Mfg. Co., punch press firm, is doubling its plant area at 5211 Telegraph Road, Los Angeles 22, Calif. Expansion includes increased production facilities and the development of automatic and semiautomatic mass production processes in the manufacture of small punch presses. Also on Kenco's agenda for 1956 are new, advanced presses designed for integration into mechanized production systems.

Diecaster Enlarges Facilities

Accurate Die Casting Co., Cleveland, producer of aluminum, zinc and magnesium diecastings, has added 23,500 sq ft of space to its manufacturing area. One new plant with 4000 sq ft is devoted to magnesium diecastings; another, with 11,000 sq ft, is for production of aluminum diecastings; ex-

(*Please turn to page* 86)

another revolutionary development by La Salle

THE NEW

. . . gives HIGH STRENGTH . . .

"FATIGUE-PROOF" steel bars offer high strength in-the-bar . . without the expense and trouble of heat treating. Tensile strength is in the 140,000 to 150,000 p. s. i. range . . hardness which is related to this strength level is approximately 30 Rockwell "C."

"FATIGUE-PROOF" has uniform strength across the bar . . no soft centers. (This uniformity is maintained from bar to bar . . lot to lot.) This remarkable uniformity of strength makes "FATIGUE-PROOF" ideal for applications in the 140,000 to 150,000 p. s. i. range that formerly required heat treated carbon and alloy steels, either hot rolled or cold drawn.

With "FATIGUE-PROOF" you'll get the advantages of heat treating . . none of the disadvantages. In short, you'll get a better part at lower cost.

. . . yet it's EASY TO MACHINE

"FATIGUE-PROOF" *is* a free-machining steel bar . . without question. It machines at least 25% faster than annealed alloys . . 50% to 100% faster than heat treated alloys.

"FATIGUE-PROOF's" excellent machinability permits faster speeds, heavier feeds, better tool life . . your production rates will increase . . you'll get more parts per hour.

Distortion from machining is held to a minimum . . there is no reduction of tool life due to the higher speeds and heavier feeds . . and surface finish is greatly improved.

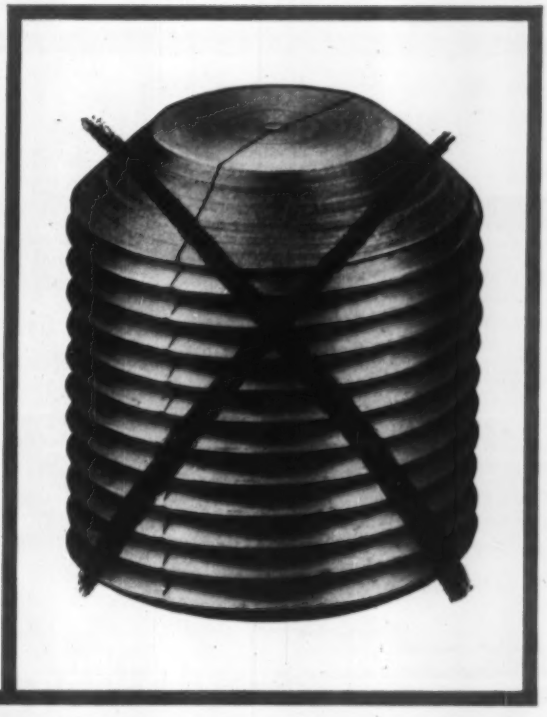
La Salle STEEL CO.

1414 150th Street, Hammond, Indiana

Manufacturers of America's Most Complete Line of Quality Cold-Finished Steel Bars

fatigue-proof STEEL BAR

WITHOUT HEAT TREATING

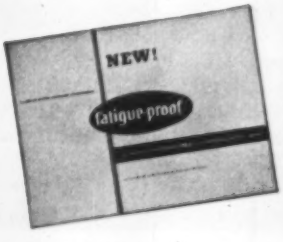


- *no quench cracks*
- *no distortion from heat treating*

With heat treating eliminated, the problems that accompany heat treating are avoided. Quench cracks become a thing of the past. Distortion and warpage from heat treating don't occur . . consequently time consuming and costly straightening and cleaning operations are not necessary.

You eliminate not only the cost of heat treating but also its disadvantages.

If you have parts where strength is a requirement . . you can save money and get away from problems by using "FATIGUE-PROOF." Our Sales Engineers will be happy to show you how this can be accomplished and provide samples for test purposes.



JUST PUBLISHED! Ask for your copy of the new 20-page booklet which gives additional information on the remarkable new "FATIGUE-PROOF."

LA SALLE STEEL CO.
1414 150th Street
Hammond, Indiana

Please send me your "FATIGUE-PROOF" Bulletin.

Name_____
Title _____
Company_____
Address_____
City_____ Zone____ State_____

need a finish to beat these specs?

specify IRIDITE

AN-C-170 MIL-S5002 MIL-C-5541 AN-P32
AMS-2402A USA-50-80-11A J.Q.D. No. 144B
USA 57-93-2A O.S. No. 1374 USA 57-0-2C AN-P61
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if you're finishing under these or similar specifications, here's how you can use Iridite:

ON ZINC AND CADMIUM you can get highly corrosion resistant finishes to meet any military or civilian specifications and ranging in appearance from olive drab through sparkling bright and dyed colors.

ON COPPER . . . Iridite brightens copper, keeps it tarnish-free; also lets you drastically cut the cost of copper-chrome plating by reducing the need for buffing.

ON ALUMINUM Iridite gives you a choice of natural aluminum, a golden yellow or dye colored finishes. No special racks. No high temperatures. No long immersion. Process in bulk.

ON MAGNESIUM Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly treat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD

(*Concluded from page* 83)

isting tool and die room facilities have been increased 8500 sq ft.

Expands Machinery Division

Clark Equipment Co., Buchanan, Mich., is expanding its Construction Machinery Division plant at Benton Harbor, Mich., by 50 per cent (125,000 sq ft). The company has just opened a new headquarters administrative building. It climaxed a 100,000-sq-ft expansion program started nine months ago.

Snyder Acquires More Space

Snyder Tool & Engineering Co. has purchased a building at 1030 McDougall, Detroit, close to its main plant at 3400 E. Lafayette Ave. The expansion is the result of pressing requirements for adequate warehouse facilities to speed the building of huge, automated special machine tools.

Landis Machine Enlarges Plant

Landis Machine Co., Waynesboro, Pa., is erecting an 11,250-sq-ft addition to its Tap Division building. It will house the research department and the newly created thread roll die department.

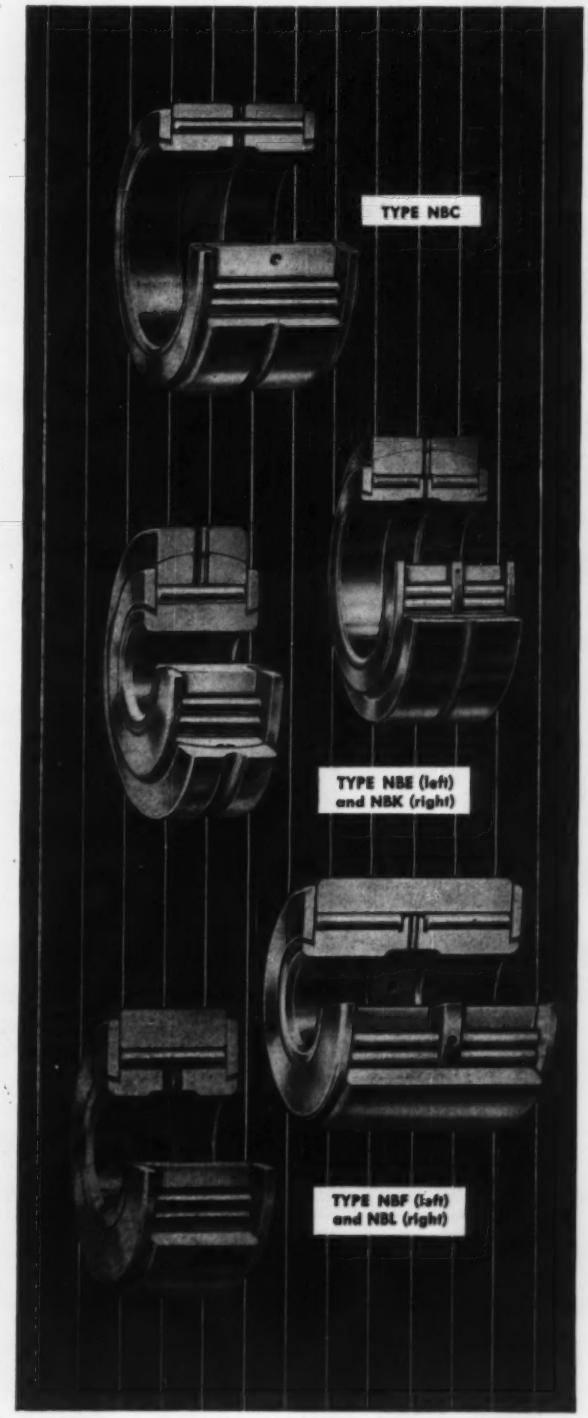
Republic Forms Service Unit

Republic Steel Corp. established an International Projects Division to handle increasing demands from foreign industries for technical, engineering and manufacturing know-how. David H. Bellamore is division director, with offices in the Chrysler building, New York. L. I. Underwood succeeds Mr. Bellamore as general export manager, effective Jan. 1.

Machinery Firm Boosts Capacity

Poor & Co.'s subsidiary, Pioneer Engineering Works Inc., Minneapolis, purchased the Como avenue plant of Minneapolis-Moline Power Implement Co. in that city and the adjoining plant of United States Air Conditioning Corp. The two properties have more than twice the facilities Pioneer had at its former location. The acquisitions are part of Pioneer's $2-million ex-

TORRINGTON
NB SERIES NEEDLE BEARINGS
For Oscillating Motion or Heavy Rolling Loads



Torrington NB Series Needle Bearings employ the same needle roller principle as the famous DC Type Bearing.

They are available in the five types illustrated, all being of nonseparable construction and designed for periodic relubrication. Outer and inner races are of high carbon, chrome steel, hardened and precision ground.

Like the DC Type, the compact design of NB Series Needle Bearings permits saving in size and weight of surrounding parts.

Torrington NB Series Needle Bearings have been used extensively in the aircraft industry and for ordnance work where their extremely high static capacity and anti-friction characteristics enable them to withstand heavy impact loads.

Designs can be modified to meet industrial applications involving rotating motion.

Type NBC—oscillating motion only. Designed specifically for applications in which the OD is supported by a housing and the washers are backed up by clamping surfaces.

Types NBE and NBK—oscillating motion only. Self-aligning. Designed for applications where it is difficult to obtain alignment during assembly or where deflections make a self-aligning bearing desirable.

Types NBF and NBL—heavy rolling loads. Designed for use as rollers under heavy loads at slow speeds.

See our new Needle Bearing Catalog in the 1955 Sweet's Product Design File—or write direct for Catalog No. 55.

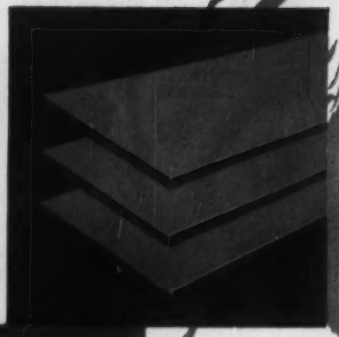
THE TORRINGTON COMPANY
Torrington, Conn. South Bend 21, Ind.

District offices and distributors in principal cities of United States and Canada

TORRINGTON NEEDLE BEARINGS

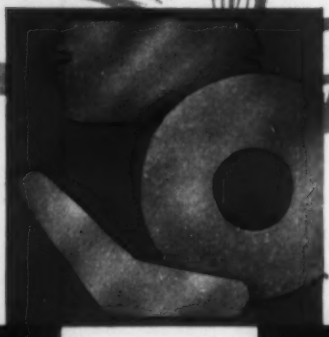
Needle • Spherical Roller • Tapered Roller • Cylindrical Roller Ball • Needle Rollers

meet the Claymont family . . .



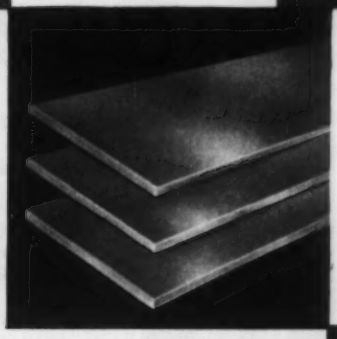
CF&I LECTRO-CLAD
Nickel Plated Steel

CLAYMONT
Flame Cut Steel
Plate Shapes

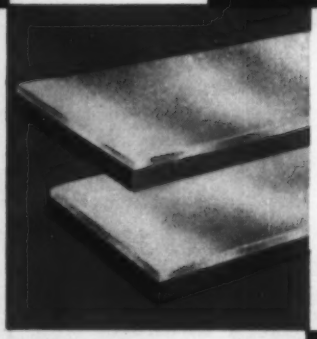


CLAYMONT
Flanged and Dished
Heads

CLAYMONT
Carbon and Alloy Steel Plates
(including Abrasion-Resistant and Low Alloy High Strength Steel Plates)



CLAYMONT
22" to 36"
Welded
Steel Pipe



CLAYMONT
Stainless-Clad
Plates

Why not become better acquainted today?

Just contact our nearest sales office, or

write to Wickwire Spencer Steel Division,

The Colorado Fuel and Iron Corporation,

P. O. Box 1951, Wilmington, Delaware.

Claymont Steel Products

CF&I

3539

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

Abilene • Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles
New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita
CANADIAN REPRESENTATIVES AT: Edmonton • Toronto • Vancouver • Winnipeg

pansion program which will include such improvements as modern machines and equipment at the new location. The company makes machinery.

American Chain Enlarges Plant

American Chain & Cable Co. Inc., Bridgeport, Conn., will build an addition to its factory at Adrian, Mich. It will add about 20,500 sq ft of working space, making a total of about 200,000 sq ft under plant control. Costs: About $210,000 for the addition and $253,000 for new equipment. The plant makes automobile emergency brake controls, aircraft controls, stainless steel aircraft terminals and heavy-duty emergency brakes.

Houdaille Changes Name

Houdaille Industries Inc. is the new name of Houdaille-Hershey Corp., Buffalo. In addition to a wide diversity of products in the automotive, aircraft and refrigeration fields, Houdaille produces force-feed lubricators, chemical feeders, tools, defense weapons, crushed stone and other construction materials.

Cory Expands in Canada

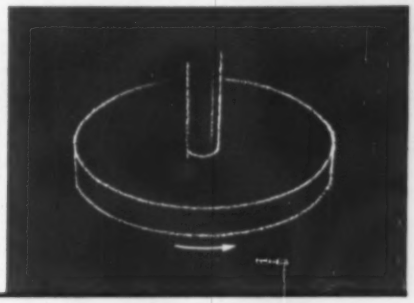
Cory Corp. (Canada) Ltd. added more than 10,000 sq ft to its manufacturing facilities in Toronto, Ont. The plant makes housewares and appliances. Cory's dominion sales were realigned into three major divisions: Western Sales Division, supervised by J. Barry Crouch; Eastern Sales Division, supervised by D. R. Steel, Montreal, Que.; Central Sales Division, supervised by G. C. Grogan, Toronto.

Ryerson Buys Plant in East

Joseph T. Ryerson & Son Inc., steel warehousing subsidiary of Inland Steel Co., Chicago, announces the second expansion step this year in its New England operations. The company purchased the property and inventory of the Wallingford, Conn., plant of Follansbee Metals Corp., bringing to 17 the locations through which it conducts its steel distribution busi-

(*Please turn to page* 92)

HOLCROFT and the ROTARY FURNACE



high production in small space

Production rates frequently bog down when floor space limitations prohibit large equipment purchases.

That's why—when the problem is heat treating—many companies turn to Holcroft for answers. Experience—imaginative engineering—versatility of products—all team up to provide answers.

For example, the solution to the problem above could conceivably be a rotary furnace; with one or two doors for loading and unloading and a rotating hearth which carries the stock through the heat treat cycle. The hearth can be of a heat-resistant alloy or a refractory material—can be suspended from above or supported from below. Rotary furnaces can be tunnel-type, grid-type, drum-type, or rotating retort.

Of course, this is only one of the many kinds of stock handling which might be suggested by Holcroft. Your problem probably will be different and Holcroft will have the answer.

Write today for a copy of Holcroft's illustrated book: "Blazing the Heat Treat Trail." It's bound to give you food for thought.

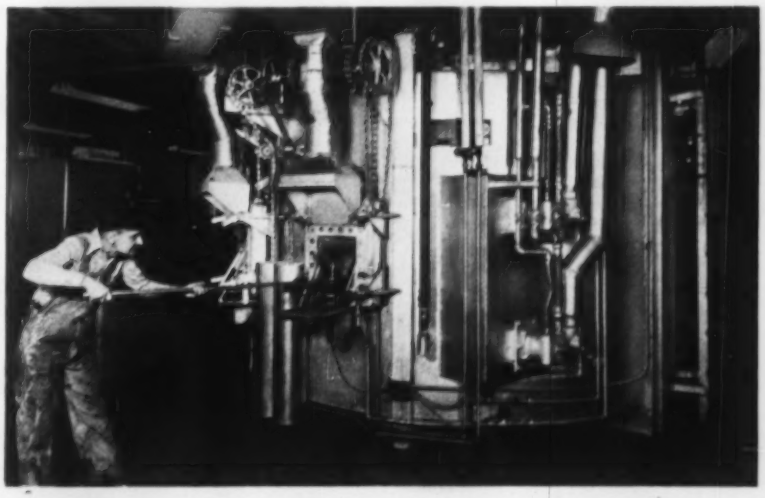
4675

HOLCROFT AND COMPANY

6545 EPWORTH BOULEVARD • DETROIT 10, MICHIGAN

PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO, ILL. • CLEVELAND, OHIO • DARIEN, CONN. • HOUSTON, TEXAS • LOS ANGELES, CALIF. • PHILADELPHIA, PA.
CANADA: Walker Metal Products, Ltd., Windsor, Ontario



The Continuing Census of Metalworking

MAINTAINED SINCE 1938 BY THE PENTON PUBLISHING CO., PENTON BUILDING, CLEVELAND 13, OHIO

PLEASE INDICATE ANY CHANGES IN NAME OR ADDRESS

[redacted]

1 What products are manufactured or designed at THIS address?

MAJOR PRODUCTS Road Machinery: Motor graders, Trawloaders

OTHER PRODUCTS

2 Which of the following activities apply to THIS address:

- ✓ Manufacturing
- ✓ Designing
- ✓ Sales
- ✓ General Office
- ✓ Rebuilding or Repairing
- ✓ Research
- ☐ Other (Please describe)

3 What is the average total employment at THIS address?

- ☐ 1-9
- ☐ 10-19
- ☐ 20-49
- ☐ 50-99
- ☐ 100-249
- ☐ 250-499
- ✓ 500-999
- ☐ 1000-2499
- ☐ 2500 or more (Please state total)

3531
353
3531

4 If this is a plant, what was its gross sales volume (or value of shipments) in 1954:

- ☐ Less than $100,000
- ☐ $100,000-$249,000
- ☐ $250,000-$499,000
- ☐ $500,000-$999,000
- ☐ $1,000,000-$2,499,000
- ☐ $2,500,000-$4,999,000
- ☐ $5,000,000-$9,999,000
- ✓ $10,000,000 and over
- $ [redacted]

5 If designing is done HERE, how many individuals with specifying authority or influence machines, appliances or mechanical equipment? 26

If designing is done elsewhere, please give address

6 What other manufacturing plants are operated as part of this company or its div name, street address, city and state None

7 Which of these operations are performed at THIS address:

- ✓ Machining
- ☐ Foundry (Except Die Casting & Ingots)
- ☐ Die Casting (Pressure)
- ☐ Forging
- ✓ Heat Treating or Annealing
- ✓ Stamping, Blanking or Drawing
- ☐ Other Sheet Metal Work
- ☐ Plate or Structural Fabrication
- ✓ Welding (Arc or Gas)
- ✓ Welding (Resistance, Spot or Flash)
- ✓ Pickling
- ✓ Metal Washing or Degreasing
- ☐ Sand or Shot Blasting
- ☐ Electroplating
- ☐ Galvanizing or Tinning
- ✓ Buffing or Polishing
- ☐ Porcelain Enameling
- ☐ Lacquering, Enameling, etc., on product
- ✓ Assembly of Product
- ☐ Smelting and Refining
- ☐ Rolling

8 Please PRINT OR TYPE names of the following individuals IF THEY ARE LOCATED AT THIS ADDRESS:

[redacted]
PRESIDENT
[redacted]
VICE-PRESIDENT
[redacted]
GENERAL MANAGER
[redacted]
PURCHASING AGENT
[redacted]
PLANT MANAGER
[redacted]
FOUNDRY SUPERINTENDENT
[redacted]
CHIEF ENGINEER
[redacted]
CHIEF DESIGN ENGINEER

how PENTON's use of S.I.C. adds to the effectiveness of your advertising

- Let's start with the PENTON market questionnaire.
- It's been standard practice with us to conduct a Continuing Census for use in our publishing operations. (Incidentally, we were the first industrial publisher to start this over 15 years ago.)
- Notice how a company reports to us on the major products manufactured, as well as any other products made at this location.
- We then translate this into S.I.C. code numbers for proper classification on IBM cards. The S.I.C. or Standard Industrial Classification* system was developed by the U. S. Bureau of the Budget. It is, by far, the most acceptable method in use today for classifying manufacturing plants by product categories and represents a major forward movement in marketing to industry.

PENTON looks upon unit coverage as the first essential in measuring how effectively a publication reaches its market. We use S.I.C. not merely as a filing system, but as the basis for effectively *matching* publication coverage to the number of worthwhile establishments in the market.

You benefit in many ways from our use of S.I.C. When you use a PENTON publication you know that you're covering the highest possible proportion of the worthwhile units in the market. You can see this in our modern method of reporting circulation breakdowns by S.I.C. classifications. It tells you how many plants are reached and how many copies go into these plants.

Using this information to buy space helps you add to the *effectiveness* of good advertising.

*All manufacturers use this system in reporting to the U. S. Bureau of the Census.

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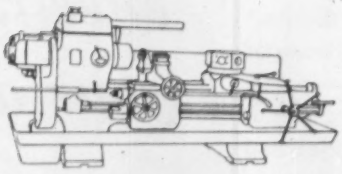
LET SIMMONS REBUILD AND MODERNIZE YOUR TURRET LATHES

Investigate the important production, maintenance and tax savings of SIMMONS ENGINEERED REBUILDING for your: Lathes, Planers, Surface Grinders, Cylindrical Grinders, Vertical Millers, Openside Planers, Automatics, Vertical Boring Mills, Turret Lathes and Radial Drills.

A qualified Simmons rebuilding engineer will discuss it with you. Write, wire or phone today. Simmons Machine Tool Corporation, 1755 North Broadway, Albany 1, N.Y.



Write for Simmons Way... case histories of rebuilding jobs.

SIMMONS GIVES MACHINE TOOLS A NEW LEASE ON LIFE

Unconditional guarantee...our standard since 1910

★ PUNCHES ★ DIES ★ RIVET SETS ★ COMPRESSION RIVETER DIES ★

We carry your inventory.
Large stock for your convenience.
Special tools to order.
Quality and workmanship guaranteed.
Prices on Application.
Write Dept. A for New Catalog 54

GEO. P. MARCHANT COMPANY
1420-34 So. ROCKWELL STREET · CHICAGO 8, ILLINOIS

(*Concluded from page 89*)

ness. Ryerson expanded its Boston operations last March through acquisition of the Arthur C. Harvey Co.

Crown Cork Plant Diversifies

Crown Cork & Seal Co.'s Western Division is diversifying its San Francisco plant to include the production of beer cans. A high-speed production line is being installed and is expected to start operations in May, 1956.

Structural Steel Firm Expands

Allied Structural Steel Companies, Chicago, acquired Glazer Steel Corp.'s Knoxville, Tenn., structural fabricating facilities. The plant will continue under the managership of Byron McKenzie. Glazer Steel Corp. plans to expand its warehousing operations in New Orleans.

Chiksan To Build in Houston

Well Equipment Mfg. Corp., an operating division of Chiksan Co., Brea, Calif., will build a second plant in Houston for the manufacture of swivel joints and flexible line assemblies. Weco's present Houston plant makes a line of wing unions, snatch blocks and other specialty items for the petroleum industry.

NEW ADDRESSES

The Detroit sales office of **Illinois Tool Works**, manufacturer of machines and cutting tools, and its Shakeproof Division, producer of fastening devices, moved to 1403 E. State Fair.

San Francisco offices of **U. S. Steel Corp.'s Columbia - Geneva Steel Division, Consolidated Western Steel Division** and **American Bridge Division** moved to the Equitable Life Bldg., 120 Montgomery St.

Oster Mfg. Co., manufacturer of pipe and bolt threading machinery and materials handling equipment, completed its move to a plant on E. 289th street, Wickliffe, O.

Efficient, fume-free Clark Electric stacks crated stoves 3 high at White Auto Sales, Wichita Falls, Texas.

CLARK ELECTRICS

work a longer cycle . . . do more work!

There just isn't any other power type that can move material at a lower cost per ton-mile than a Clark Electric. Clark's field-tested gear train and exclusive dual field, high torque motor provide maximum efficiency under the most severe operating conditions.

NO WASTED POWER . . .

Clark's exclusive dual field motor offers minimum amperage draw. External resistance is utilized only in the first two points of power, thereby eliminating wasteful power losses and overheating. Result! Your battery works a longer cycle . . . your equipment does more work.

At 4th point of power Clark's exclusive *dual field construction* is achieved by eliminating half the field resistance (indicated in red).

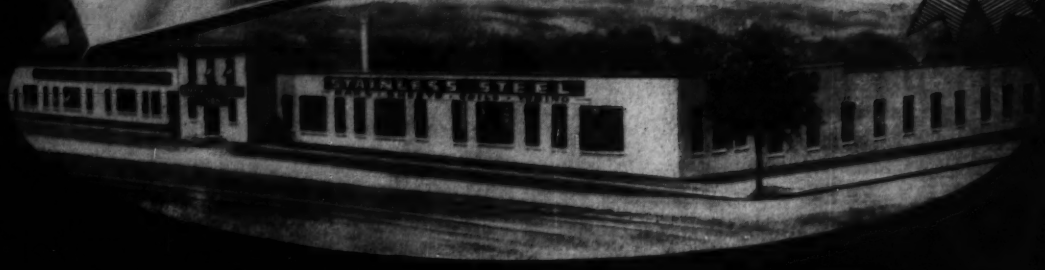
Write for the booklet "Electri-Facts" showing cutaways of the power train, control circuit, hydraulic system, and other important components.

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 26, Michigan

CLARK® EQUIPMENT

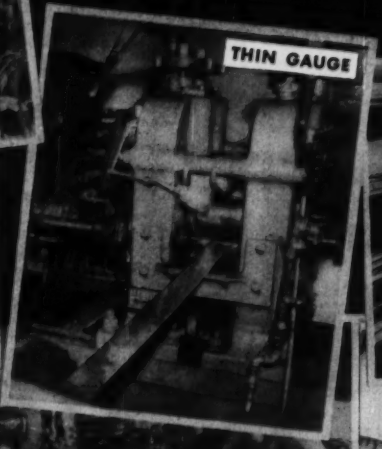
ULBRICH Stainless Steels

Certified ANALYSIS can be given on any Ulbrich material.



COMPLETELY EQUIPPED CONVERTING WAREHOUSE

STRIP • Flat Wire and other Stainless Steels
Converted to your closest requirements and
exactly as you want it!
Inquiries for small lots welcomed.



ULBRICH Stainless Steels

WALLINGFORD, CONN.
Phone: COlony 9-7771

STEEL
December 12, 1955

Technical Outlook

PORTABLE ROBOT— Unveiled two weeks ago at Ford's Cleveland Stamping plant: An automatic loader and unloader that can be moved from one press to another. It can be set up for a variety of parts. Plug-in connections provide power and quick adaptability to cams and limit switches on the presses. Ford's automation department designed it.

MINIMUM DOWN TIME— Emphasis is on cutting iron-to-iron down time to the bone in the new blast furnace Koppers is building for Granite City Steel. The stack will be built in an area adjacent to the old one. When it is finished, it will be rolled into position just as soon as the old stack has been torn down. With some modifications, the foundations of the old furnace will be used. The new furnace will take seven months to build. Shutdown time will be about 120 days.

BOUNCING BARRELS— Rubber containers, small as a carboy or big as a haystack, are made by U. S. Rubber Co. They are for shipping and storing liquids and granular or powdery materials. When empty, the big ones will collapse like balloons.

BOTTOM TENDER— Big ship bottoms get sacrificial anode protection. Now motor launches can have it, too. A streamlined magnesium anode has been designed for bolting to the hull.

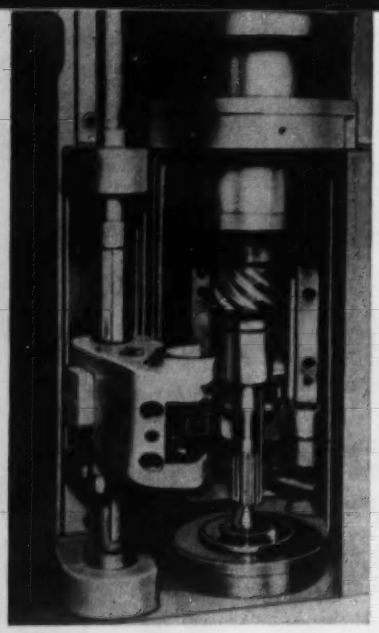
TINLESS CAN— A new food can developed by American Can Co. has an aluminum instead of a tin coating. Sideseams are welded instead of soldered — making it entirely tinless. Dr. Randall Royce, manager of Canco's Atlantic division research laboratories, told the Pennsylvania Canners Association: "The aluminum coating on both bodies and ends gives better protection than tin on the outside of cans. The inside of the can is lined with an enamel coating." Welded sideseams make the can stronger than regular soldered types. In tests, the can's steel walls break before seams separate.

GOOD INVESTMENT— What tolerances can you get with investment castings? Aluminum can be cast as thin as 1/32-in., steel as thin as 3/64-in., with 120 (steel) to 60 (aluminum) microinch finishes. Tolerances can be held to ± 0.005-in. per linear inch. Small parts, ¼-in. or less, can be held to ± 0.003-in. and bulky sections to ± 0.155-in.

HELIUM SUBSTITUTE— Linde has developed a new shielding gas mixture to replace helium in high-speed, high-voltage applications of electric welding on stainless steels and other metals. Called "H-15 Argon mixture," it's said to be cheaper than helium because of lower flow rates needed for adequate shielding.

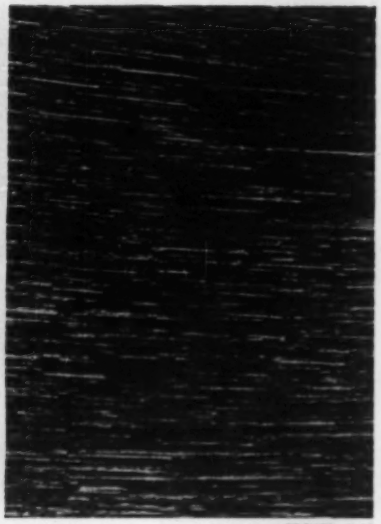
ALUMINUM BATTERY— A number of applications are being explored for aluminum dry cells now under final development, says Alcoa. The can for the battery follows the alclad principle — it's made of two alloys bonded together. Composition is such that the inner part has a solution potential higher than the outer part, so it's consumed preferentially during discharge or storage. The outer part is an inert barrier to prevent pinhole attack. The aluminum cell (1.6 to 1.7 volts) uses the same cathode as a zinc one — a mixture of manganese dioxide and acetylene black.

Metalworking Outlook—p. 49 *Market Outlook—p. 145*



This quenching machine prevents distortion. The rear axle drive pinion shown is held securely and quenched in the same operation

UNETCHED X-10



ETCHED X-10

A rough surface finish increases gear noise and wear. The photomacrographs show a rough finish (left) and a smooth finish (right). Adding sulphur to the composition of steel improves machinability, sometimes surface finish, too. Sulphur should not be used where impact and clashing resistance are required

The Over-All Look in Gear

A GEAR DESIGNER faces more problems than tooth size and proper metal. After deciding upon such engineering preliminaries, he must consider a host of processing requirements before he can finalize his design.

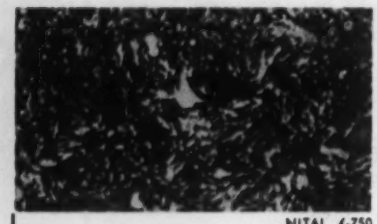
Cost accountants badger him to produce a cheaper design. Production management wants him to relieve a bottleneck. Shortages may shut off his source of metal.

Tough competitors often force a change in design. Big industry is staffed by men whose only job is to examine competitive products.

Quality—Plant management will emphasize quality control. The designer must consider whether tolerances can be held economically with commercially available equipment.

Gear noise will plague everyone, including the designer, even after the car is on the road. Some gear manufacturers use electronic devices to measure noise levels. In spite of such refinements, gear noise is still measured by how it sounds in the car.

How much it will cost to maintain the quality level you establish can only be measured by adequate experience. Final production will provide the necessary information.



NITAL A-750

NITAL X-750

More Case-Depth Vs. More Ammonia

Buick at first used continuous gas carburizing furnaces to treat conventional transmission gears. Designers later decided to add 0.5 per cent ammonia but came up with erratic case hardening that could show up in gear tooth pitting. The photomicrograph on the left shows the results of this treatment. Two solutions were possible: Increase the case depth by buying more equipment, or increase the nitrogen effect. The solution was to leave the case depth unchanged at 0.005 to 0.010 in. and increase the ammonia in the furnace atmosphere to 1.5 per cent. The harder case is shown in the microstructure on the right.

The drawing board is only the beginning in the auto industry. Its experience with diversified problems can help you put the broader look into your engineering program

Design

Material—The best steel will be the cheapest one that will do the job.

Which is cheapest? You must consider availability, machinability, initial cost, heat treating cost, uniformity of heats and performance. Obviously, a good steel that is easily machined but hard to buy is not the right one. Nor is the steel right if processing is too complicated. The preferred steel will be the one that requires few steps to make it suitable.

Steels vary between heats. You have to be certain that the supplier's specifications are well within the limits of your own requirements. Borderline cases have a tendency to show up in the complaint statistics. Buick, for example, runs pilot lots for new heats to determine distortion characteristics.

Processing—The larger manufacturers maintain process engineering departments that specify the way the gear will be made. A new

The Over-All Look in Gear Design

Ring Gear

Manufacturer	S.A.E. Steel	Carburizing Method	Case Depth (Inches)	Quench Medium Type	Quench Medium Temp (F)	Tempering Temp (F)
A	8615	Pack	0.040–0.055	Oil	130–140	325
B	4620	Gas	0.045–0.055	Oil	115	375
C	8617H	Gas	0.040–0.045	Oil	115	325
D	8620	Gas	0.040–0.050	Oil	130	None
E	8620	Gas	0.040–0.050	Oil	110	425
F	1024	Gas	0.030–0.040	Oil	130–140	350
G	4028	Gas	0.040–0.050	Oil	130–140	360
H	4028	Gas	0.040–0.050	Oil	100–120	350–375
I	4118	Gas	0.040–0.050	Oil	130–150	350

Drive Pinion Gear

Manufacturer	S.A.E. Steel	Carburizing Method	Case Depth (Inches)	Quench Medium Type	Quench Medium Temp (F)	Tempering Temp (F)
A	8617	Gas	0.045–0.060	Oil	130–140	325
B	4620	Gas	0.045–0.055	Oil	115	400
C	8617H	Gas	0.040–0.045	Oil	115	None
D	8620	Gas	0.040–0.050	Oil	130	None
E	8620	Gas	0.040–0.050	Oil	110	300
F	1024	Gas	0.030–0.040	Oil	130–140	350
G	4028	Gas	0.045–0.055	Oil	130–140	360
H	4028	Gas	0.040–0.050	Oil	100–120	350–375
H	8620	Gas	0.040–0.050	Oil	100–120	350–375
I	4118 Mod	Gas	0.040–0.050	Oil	130–150	350

Side Pinion

Manufacturer	S.A.E. Steel	Carburizing Method	Case Depth (Inches)	Quench Medium Type	Quench Medium Temp (F)	Tempering Temp (F)
A	5130	Gas	0.005–0.015	Oil	130–140	350
B	1022	Pack	0.045–0.055	Caustic	85	350
C	8617H	Gas	0.040–0.045	Oil	115	None
D	8615	Gas	0.040–0.050	Oil	130	None
E	1024	Gas	0.040–0.050	Oil	110	300
F	1024	Gas	0.020–0.030	Oil	130–140	350
G	8620H	Gas	0.030–0.040	Oil	130–140	360
H	4024	Gas	0.030–0.040	Oil	100–120	350–375
I	1016	Gas	0.040–0.050	Water	.....	None

Side Gear

Manufacturer	S.A.E. Steel	Carburizing Method	Case Depth (Inches)	Quench Medium Type	Quench Medium Temp (F)	Tempering Temp (F)
A	5130	Gas	0.005–0.015	Oil	130–140	350
B	1024	Gas	0.045–0.055	Oil	115	350
C	8617H	Gas	0.040–0.045	Oil	115	None
D	8615	Gas	0.040–0.050	Oil	130	None
E	1024	Gas	0.040–0.050	Oil	110	300
F	1024	Gas	0.020–0.030	Oil	130–140	350
G	8620H	Gas	0.030–0.040	Oil	130–140	360
H	4027	Gas	0.030–0.040	Oil	100–120	350–375
I	1132	Gas	0.015–0.025	Oil	130–150	400

The Over-All Look in Gear Design

Auto Transmission Pinions

Manufacturer	S.A.E. Steel	Carburizing Method	Case Depth (Inches)	Quench Medium Type	Quench Medium Temp (F)	Tempering Temp (F)
A	5145	Gas	0.007–0.010	Oil	125–130	440
F	1024*	Gas	0.020–0.030	Oil	130–140	350
H	4028	Gas	0.030–0.040	Oil	170–180	400
I	1330H	Gas	0.007–0.012	Oil	325	400
J	5140H	Gas	0.005–0.010	Oil	300	375–510
J	5145H	Gas	0.005–0.010	Oil	300	510

Manual Transmission

Manufacturer	S.A.E. Steel	Carburizing Method	Case Depth (Inches)	Quench Medium Type	Quench Medium Temp (F)	Tempering Temp (F)
A	8620	Gas	0.035–0.050	Oil	120–130	300–350
B	5117	Gas	0.040–0.050	Oil	110–130	300
B	1340H	Gas	0.005–0.010	Oil	130–150	400
C	8640H	Gas	0.008–0.015	Oil	115	425
D	8620H	Gas	0.040–0.050	Oil	180 or	375
				Salt	400	
F	1024	Gas	0.030–0.040	Oil	130–140	350
			0.020–0.030	Oil	130–140	350
G	5135H	Gas	0.012–0.016	Oil	130–140	360
H	4027	Gas	0.030–0.040	Oil	145–175	400–410
I	1340H	Gas	0.005–0.010	Oil	130–150	400

Flywheel

Manufacturer	S.A.E. Steel	Carburizing Method	Quench Medium Type	Quench Medium Temp (F)	Tempering Temp (F)
A	1050 Mod.**	Furnace	Oil	130–140	750
C	1045	Flame	Oil	115	500–600
F	1050	Flame	Oil	130–150	500
G	1946	Induction	Water†		700††
H	1045	Flame	Oil	100–120	500–600††
I	1045	Flame	Oil	130–150	500–550††
J	1045	Flame	Oil	130–150	550

*1200° F after rough machining
**Carbon 0.48-0.53; Manganese 0.85-1.05 coarse ground
†Removed at 550° F
††Induction

This chart compares the gear steel selection and treatment of several automobile manufacturers. It is adapted from information compiled by V. E. Hense, chief metallurgical engineer, Buick Division, for GM's *Engineering Journal* (Sept.-Oct. '55).

material calls for co-ordinated effort to cut later design changes.

Machining costs will be tied closely to surface finish and tool life. The proficient designer gets as much production data as he can to estimate final production costs.

Testing—No design is final until the gear has been tried out in service. Lab tests are necessary and useful, but the acid test is service. Wear, shock resistance and quietness of operation are the important points to consider.

From the designer's viewpoint, however, most unsatisfactory gear designs are rejected for heat treating and processing deficiencies.

Heat Treatment — The designer may choose one or a combination of annealing, cycle annealing, normalizing or case hardening. If the gear is forged, annealing may be necessary to permit easier machining and reduce distortion from further heat treatment.

Die quenching reduces dimensional variations from heat treatments.

A hard surface is usually desirable. Through hardening, carburizing, flame hardening, induction hardening, gas carburizing, carbonitriding—each type has physical effects that require individual knowledge and study.

The selection of a heat treating process, either annealing or hardening, is based on cost and the overall effect it has on subsequent operations.

Physical Requirements — The size, the number of teeth, the dimensions, etc., are determined by the job the gear needs to do. The designer must know the stresses involved, the kind of service expected, the conditions under which the gear will operate.

Perhaps housing limitations are a factor. The gearbox may have to be as small as possible without sacrificing efficiency.

Automotive Practices — In spite of intense study, automotive designers differ widely as to which steel and process is best for a particular application. A 1955 survey of steels used in rear axles, transmissions and flywheel ring gears shows wide variation in practice.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

Grinding Titanium with Abrasive Belts

By DR. HUGH N. DYER
Director of Product Testing
Behr-Manning Division
Norton Co.
Troy, N. Y.

THE RIGHT COMBINATION

Abrasive——Silicon carbide

Belt backing——Paper for some flat sheet work; cloth for more rugged grinding

Abrasive grit——40 to 80 for roughing and spotting; 120 and finer for high finishes

Belt support——Hard rubber, plastic or metal contact wheels

Belt speed——1500 to 2500 sfpm when using grinding fluid; 1000 to 1500 sfpm for dry grinding

Grinding fluid—Heavily sulphurized and chlorinated cutting oils for nonwaterproof belts; a 5 per cent solution of sodium nitrate in water for waterproof belts

IT COSTS six to ten times more to remove a cubic inch of titanium by abrasive belt grinding than it does to do the same amount of work with stainless.

As improvements in tools and grinding fluids come, this cost can be expected to go down. But even at present high costs, abrasive belt grinding of titanium and its alloys gives excellent results at costs competitive with other methods of stock removal.

Problem Metal — Chemical and physical properties make titanium difficult to grind with coated abrasives. The metal is so reactive at the temperatures generated in grinding that abrasive grains rapidly dull or flatten. Grains sliding over the surface create additional heat but do little useful cutting.

Successful grinding with abrasive belts depends upon reducing grain wear by lowering the temperature at the grinding point and by using grinding fluids which form protective films over the freshly cut metal surfaces.

The Right Belts—Silicon carbide coated abrasives give the best results. Paper-backed belts, used dry or with an oil or grease, are suitable for some flat sheet work. Where more rugged backing is needed, cloth-backed belts are used. Synthetic resin bonds provide maximum durability.

When water-base grinding fluids are used, waterproof cloth-backed products are necessary. Grits 40 to 80 are best for roughing and spotting, grits 120 and finer for high finishes.

Belt Support—The contact roll supporting the belt should be as small in diameter and as hard as practicable. This provides almost line contact and high unit pressure between abrasive and work. Heat build-up, dulling and glazing are reduced; fracture wear, which exposes fresh cutting edges, is promoted.

Flat shoes or platens and soft rolls usually lead to rapid belt failure from dulling. An exception is the use of a softer rubber roll for blending and spotting, as in the removal of small defects in sheet or coil, either before or after final reduction.

Belt Speed—A low belt speed reduces the temperature at the grinding point. When a grinding fluid is used, speeds between 1500 and 2500 sfpm are recommended. For dry grinding, speeds between 1000 and 1500 sfpm give good results. Low belt speed also reduces the tendency for the work surface to be scorched or marred by accumulations of incandescent chips.

In addition to cooling and quenching the spark, grinding fluids reduce the reaction between metal and abrasive grain. A grinding fluid always should be used when taking continuous cuts over fairly large areas. For interrupted cuts, such as spotting defects in sheets or bars or offhand grinding of small parts, dry grinding at low speeds gives good results.

Grinding Fluids — Heavily sulphurized and chlorinated cutting oils are good grinding fluids, and can be used with nonwaterproof, coated abrasive belts. Because of the extremely hot spark, only oils of the highest flash point (above 325°F) should be used. The fluid should be applied close to the grinding point.

Water-base grinding fluids present no fire hazard and are relatively inexpensive, but they require the use of waterproof belts. Conventional soluble oils in water are poor grinding fluids for titanium, but may be useful where the alternative is grinding dry at speeds over 1500 sfpm. Rust inhibitors of the nitrite-amine type give good results when used with water. The most effective water-base fluid found so far is a 5 per cent solution of sodium nitrite.

Welded aluminum chain fills in a high-strength, low-weight gap. It's a new material with big potential in architectural, marine, chemical processing and food handling applications

By H. F. REID Jr.
Manager, Technical Services Div.
McKay Co., Pittsburgh

A Missing Link for Chain

NO OTHER PRODUCT quite takes the place of chain. But it is heavy; for a long time we've needed a strong, lightweight, noncorroding addition to the family. It has taken until now to develop a marketable welded aluminum chain.

The McKay Co. set up a program to adapt conventional chain-making equipment and procedures to the production of welded aluminum chain. It has succeeded in developing a commercial product, made by resistance welding equipment of its own design.

Specifications—The chain is being made in four sizes: ¼, 5/16, ⅜ and ½-in. These nominal dimensions are 1/32-in. under material diameter (see table). The working load limit is about 60 per cent of the same diameter carbon steel chain.

The light weight of the aluminum chain (less than 40 per cent of steel) gives it a strength-for-weight advantage. This and its other properties—pleasing natural finish, corrosion resistance, nonsparking and nonmagnetic characteristics, ability to take colored anodized finishes—open up new fields for industrial, architectural and marine uses.

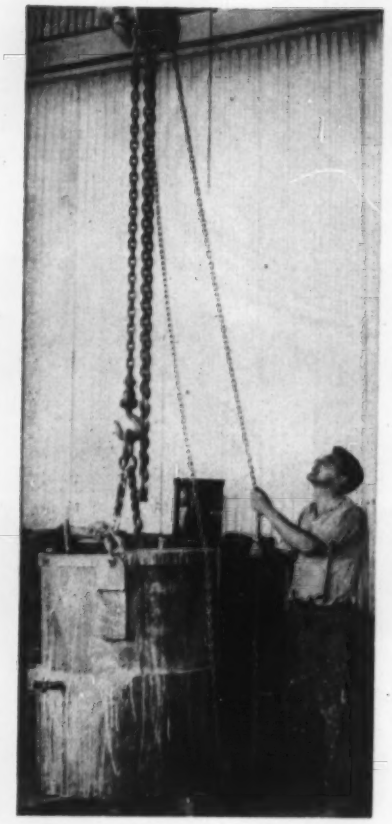
Many Uses—The product should be advantageous in chemical manufacturing, where corrosive atmospheres or explosive products demand special chain; food processing plants, where sanitation is uppermost; and other fields, such as textiles. Architectural use offers tremendous potential. The chain can be left exposed to the elements without becoming unsightly.

It is a natural in the marine field, being unaffected by fresh or salt water. Several thousand feet are in marine service.

The welded chain is being produced initially from only one alloy, 52S, and is being marketed in the as-welded condition. Further research and development work is needed before higher strength chain in some of the heat-treatable alloys is available. Look for it in about six months.

Specifications for Welded Aluminum Chain

Chain size, in.	Material diameter, in.	Inside link size width in.	Inside link size length in.	Working load limit, lb	Weight per 100 ft, lb
¼	15/64	¼	1	550	24
5/16	19/64	5/16	1 7/16	850	36
⅜	23/64	⅜	1 11/16	1200	54
½	31/64	13/32	1½	2000	91



Sparkproof welded aluminum chain handling volatile solvents in a plastics plant

Opportunities Look Up for Welded Aluminum Chain

- Chemical processing equipment
- Oil field equipment
- Explosive manufacturing and handling
- Fishing boat rigging
- Anchor chain for small craft
- Babbitt wheel chain
- Guard chain
- Decorative chain
- Food processing equipment
- Materials handling to 2,000 lb
- Lightweight sling chain assemblies
- End gate chain
- Swing chain
- Well chain
- Buoy mooring chain
- Steering gear and tiller chain
- Handrail and safety chain
- Animal leads and halters
- Passing link chain
- Pocket wheel chain
- Spinning chain

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

Step by Step

DO-IT-YOURSELF automation can be a bear trap. One Detroit builder of automation equipment gives this advice to anyone who is interested in adding automation to his plant: Engineer the process one step at a time, beginning at the beginning. It sounds fundamental, but he guesses fully half the automated headaches come from failure to follow the rule.

He puts it this way: If you have a grinding operation to remove 0.002-in. of stock, it won't work right unless the machines before it leave only 0.002-in. on the part. Or, as one auto builder found out, if you want to automatically assemble type X fasteners, you need to be sure that type X is furnished to the assembly station with no chance for others to get in.

The easiest automation job, the builder says, is on a line where equipment is already performing within required tolerances and at the right production rate. Addition of automatic handling, cycling and checking systems is a natural.

But when you start to build a new line to do a new job, every operation must be completed within tolerances at prescribed rates—otherwise, there's no sense in trying to get the succeeding steps to work.

Checker — He also feels there's too much automating of machine cycles without providing for adequate inspection. When you take the operator away, you also lose his eagle eye and quick adjustment. Automatic machines, he says, need some gage that will check part quality, either adjust or stop the machine when parts aren't right.

Stockpile Switch

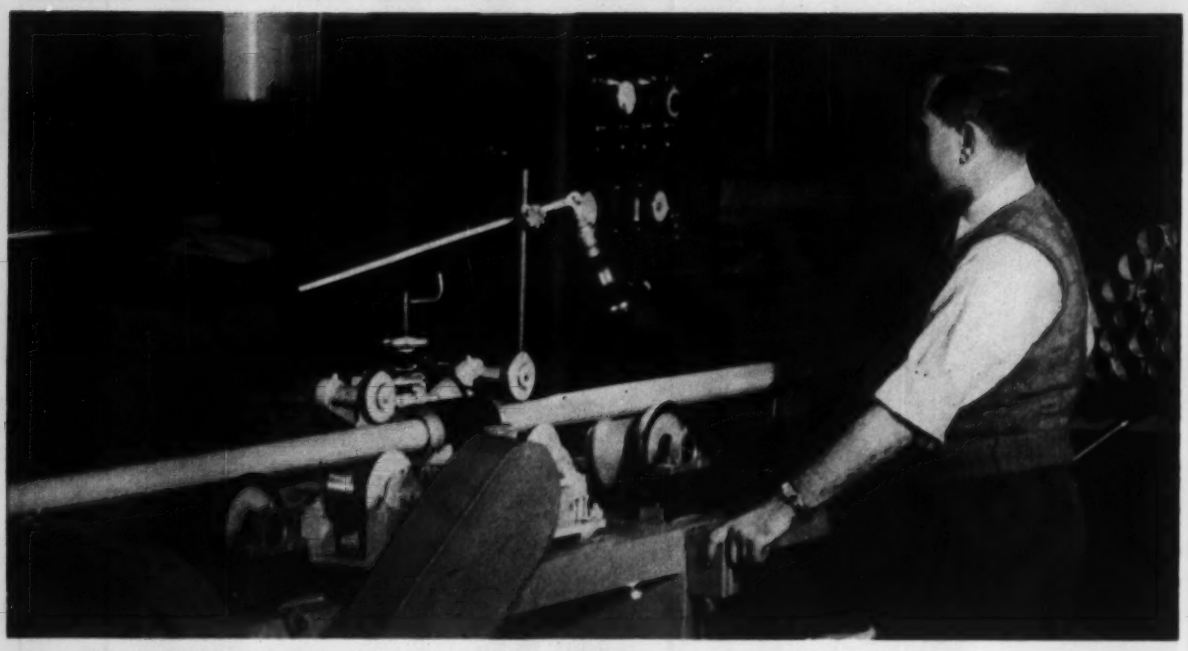
Defense officials are betting on a short war. They're more interested in reserve weapons than in reserve capacity to produce them.

The new Air Force machine tool program (STEEL, Dec. 5, p. 83) concentrates on *active* production programs.

Double Barreled — When the big *reserve* machine tool program was halted several weeks ago, it was for two primary reasons: Economy and obsolescence. The new program trims $14 million from the AF budget. Officials concluded machines bought now would be obsolete when they're needed after they observed the fast clip of machine development and improvements.

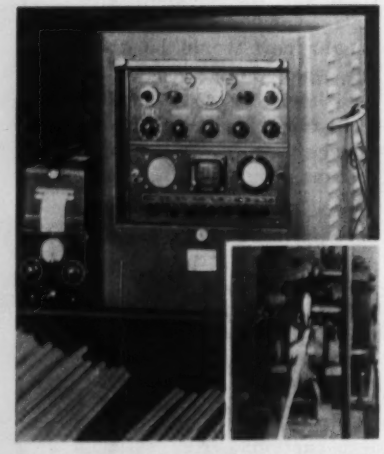
The new program satisfies them on the first count. It only partially solves the second. Machines bought and used now become just as obsolete as those bought and stored now. Continuous buying is the only answer.

Sales Job—There was no delay in putting the new plan into action. AF officials were ready to let a huge block of contracts when the other one was grounded. They quickly prepared a new tack and hustled to the Defense department. In a matter of days, the new plan got top approval. One AF representative figures almost all contracts will be let within a month.



Pressing the button gives tubing . . .

A Cheaper, Better, Faster Test



The brains and the workhead. Variations in magnetic density are interpreted by the analyzer. Colored lights, oscilloscopes, tape and buzzer tell when to reject

MAGNETIC, nondestructive testing is coming of age. A tester (complete with buzzers, lights, a tape and oscilloscopes) now inspects tubes, rods and wire made from copper, brass, Monel, aluminum and nonmagnetic grades of stainless steel. The maker says that any nonmagnetic metal can be tested.

Not only does the machine check surfaces (ID and OD) for holes, cracks, flaws or weld imperfections, it detects certain types of sub-surface defects. In addition, metals can be verified by type. For example, if type 316 stainless steel is being tested, type 304 will be rejected.

Production—Latest to adopt this method is Carpenter Steel's Alloy Tube Division in Union, N. J. Welded stainless steel tubing up to 4½-in. in diameter is tested automatically. Presently, the machine will operate at 400 fpm but a peak of 600 fpm is expected. Only one inspector is needed to operate the machine and observe results.

Although Carpenter Steel still pressure tests tubing 100 per cent, it expects that the newer, magnetic method eventually will be the only one used. Pressure (hydrostatic) testing is destructive and tests only failure. The magnetic method is more thorough and reveals quality imperfections like weepers that impede fluid flow, carburization on the ID, internal flaws that fail from fatigue, variations in wall thickness, inside and outside diameter and variations in chemistry.

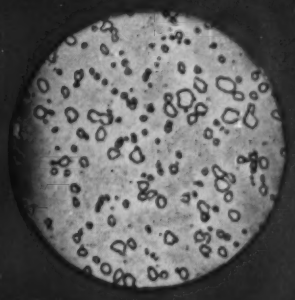
Magnetic permeability must stay within 1 and 1.6-in. each 4-in. length. Greater variations will cause rejections for nonquality reasons.

Costs—Magnetic testing is said to be three or four times faster than the hydraulic test. The equipment can be leased from the maker (Magnetic Analysis Corp., Long Island City, N. Y.).

Application—Almost every week new uses are being found. Revere Copper & Brass recently started checking copper and brass tubing with the magnetic tester. Another firm checks aluminum and Monel tubing. Still another is checking wire, some as fine as 0.003-in. There are even some high temperature steels and titanium alloys finding their way into the picture.

Several fabricators use the machine to test the quality of incoming stock. It serves as a double check for critical applications.

consistent uniformity!



SPHEROIDIZED . . .

for easier cold forming

PEARLITIC . . .

for easier blanking procedure

WEIRTON

high carbon strip cold-rolled spring steel

Manufacturers throughout the nation find Weirton cold-rolled spring steel consistently produces best results in a wide variety of products.

Weirton supplies spheroidized-annealed cold-rolled spring steel for operations where superior forming qualities are necessary. Simple and economical fabrication is assured by the exceptional ductility of the controlled grain structure.

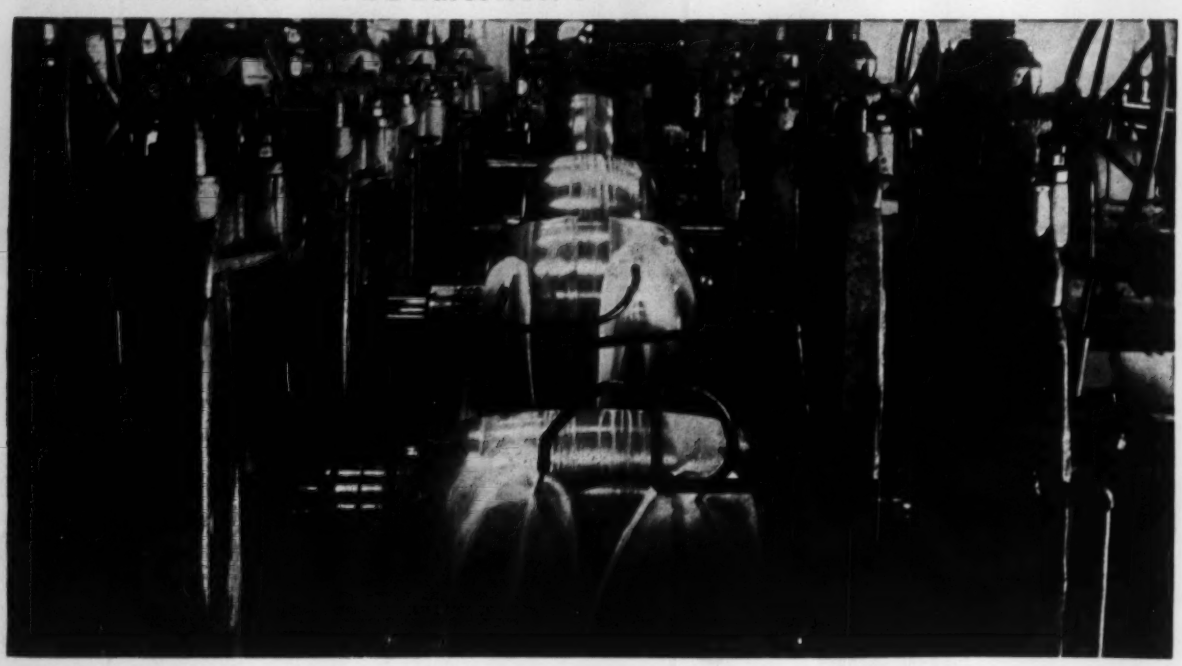
Where clean, economical blanking is the major requirement, Weirton supplies pearlitic steel structure that is temper-rolled in controlled hardness and tensile strength.

Both structures are available for specific heat treating and hardness. And in both structures, Weirton high carbon cold-rolled spring steel possesses five highly important characteristics: 1. Uniform chemical and physical properties. 2. Exact consistency of grain structure. 3. Accurate response to heat treatment. 4. Exceptional uniformity of gauge and width. 5. Controlled decarburization limits. . . . Why not let Weirton help make your product better?

WEIRTON STEEL COMPANY

Weirton, West Virginia

NATIONAL STEEL CORPORATION



Lubricant used on this 10-stand forming mill is under a constant deluge of water

One Grease for Everything

With thousands of lube fittings in its two 2700-ft long pipe mills, Lone Star Steel Co. finds a multipurpose grease simplifies maintenance and extends bearing life

LUBE APPLICATIONS in a pipe mill are critical. Bearings and equipment are subjected to heat up to 250°F, pressures up to 20 tons, high speeds and water-based coolants.

At Lone Star Steel Co., Lone Star, Tex., pipemaking is highly mechanized. Two mills form coiled skelp into welded, normalized casing, tubing and pipe at the rate of 30 to 150 fpm—350,000 net tons a year.

Maintenance Problem — From start to finish, piping is handled on a system of runout tables, roller beds and chain transfers. The operation demands an efficient maintenance program, with particular emphasis on trouble-free lubrication.

For all but one extremely high-temperature application, Lone Star uses a lithium-base, multipurpose grease which combines lithium with 12-hydroxy stearic acid (hydrogenated castor oil).

Critical Point — One of the toughest lubrication spots is the point where formed tube enters the 4000-kva Yoder electric resistance welder. The unit has four rolls, one on each side and one on top and bottom. The top roll is the electrode—twin copper discs, 57 in. in diameter. Electric current passes from one disc across the two skelp edges and out the other disc.

Transformer heat gets up to 200°F, squeeze rolls exert up to 20 tons of pressure and the entire unit is deluged with coolant. The formed metal is welded at speeds up to 120 fpm. The grease used must have high mechanical stability.

Washed Out—Before standardizing on one grease, squeeze roll and transformer bearings had to be checked every three weeks—the grease practically washed out. This meant a shutdown of 16 to 24 hours for bearing inspection.

Using the lithium-base grease, Lone Star has extended its check period to three months. When bearings have to be inspected, a replacement transformer is put on the line, reducing shutdown time to a few hours.

No Failures—There have been no bearing failures since switching to the multipurpose grease. It stays in the bearing and retains high lubricating qualities, even in

7 of the 8 open hearths in No. 2 shop at Indiana Harbor have Ramset bottoms

YOUNGSTOWN Sheet and Tube is making steel on 7 Ramset bottoms in its No. 2 open hearth shop at the Indiana Harbor Works.

The majority of bottoms installed in new open hearth shops during the past several years are of rammed construction. And of these hearths, Ramset installations number more than half again as many as any other magnesia ramming mix.

Basic Refractories pioneered the development of rammed hearth techniques several years before World War II. These methods have been continuously refined by the practical steelmakers who form the sales and service staff of Basic Refractories. As a result Ramset and Basic's installation techniques have become accepted as standard throughout the industry.

When deciding upon Ramset steelmakers select a proven refractory and proven installation methods, thus insuring the most dependable open hearth bottom construction available.

BASIC REFRACTORIES INCORPORATED 845 HANNA BUILDING, CLEVELAND 15, OHIO

REFRACTORIES ENGINEERING AND SUPPLIES, LTD. — EXCLUSIVE CANADIAN AGENTS

Advantages of One-Grease System

1. Cuts cost of handling different greases
2. Reduces bookkeeping and inventory
3. Gives the economic benefits of buying one grease in volume
4. Cuts time, expense and equipment involved in servicing thousands of lube connections
5. Eliminates misapplication of greases
6. Gives longer bearing life and extends relubrication period safely, to reduce grease consumption

the presence of water. To further extend check periods, Lone Star built a water seal for the transformer.

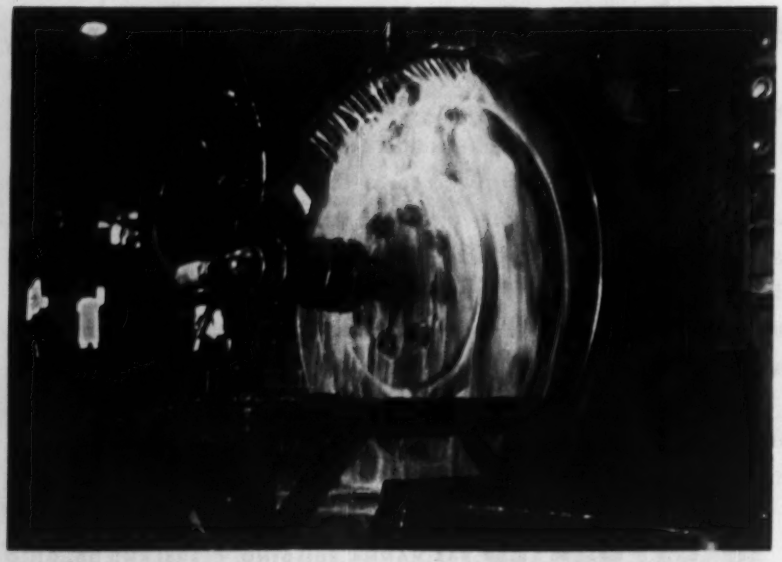
A ten-man crew makes daily rounds of the 4000 to 5000 grease fittings. With the exception of three systems (two Farval and one Lincoln), all connections are serviced with pressure guns. The men must maintain two 2700-ft long pipe mills, with a mass of automatic equipment. This would be impossible if a variety of greases and applicators were used.

Three Weights—To further simplify its procedures, Lone Star has established three grease designations—G-1, G-2 and G-3—the code numbers for different weights of Shell Oil Co.'s Alvania, the grease being used.

A step-by-step tour down the production line demonstrates the practicality of the company's one-grease system.

Pipe Making — The No. 1 pipe mill makes 4½ to 16-in. pipe and casing, with wall thicknesses ranging from 3/16 to 9/16-in. Coiled skelp weighing up to 15 tons is fed to the forming and welding mill on Link-Belt gravity rollers. G-1 lubricates the thousands of bearing points on this conveyor.

Preparing the metal for welding, the skelp is uncoiled, leveled, ends cropped, edges trimmed and shot blasted. Then it is formed into a continuous open tube in a series of ten stands. Throughout these steps, G-1 is the only grease used. Automatic Lincoln lube systems (with a 10-lb reservoir and pressures up to 2500 psi) are in operation on the uncoiler and side trimmer. There are no difficulties with pumpability.



Critical lube point is at this resistance welder. Grease here must withstand heat, pressure, coolant and high speed

Water Hazard—Pillow bearings on the approach conveyor to the stands are greased with G-1. Soluble oil-and-water spray on the formers creates a constant water hazard.

From the formers, the open tube and pipe enter the welder. G-1 is used on the squeeze rolls, G-2 on the transformer bearing. Three pull-out stands after the welder give an initial sizing to the pipe. It is cut to length by a flying cut-off machine which can sever pipe of ½-in. wall thickness in 4 seconds. All these machines are lubricated with G-1.

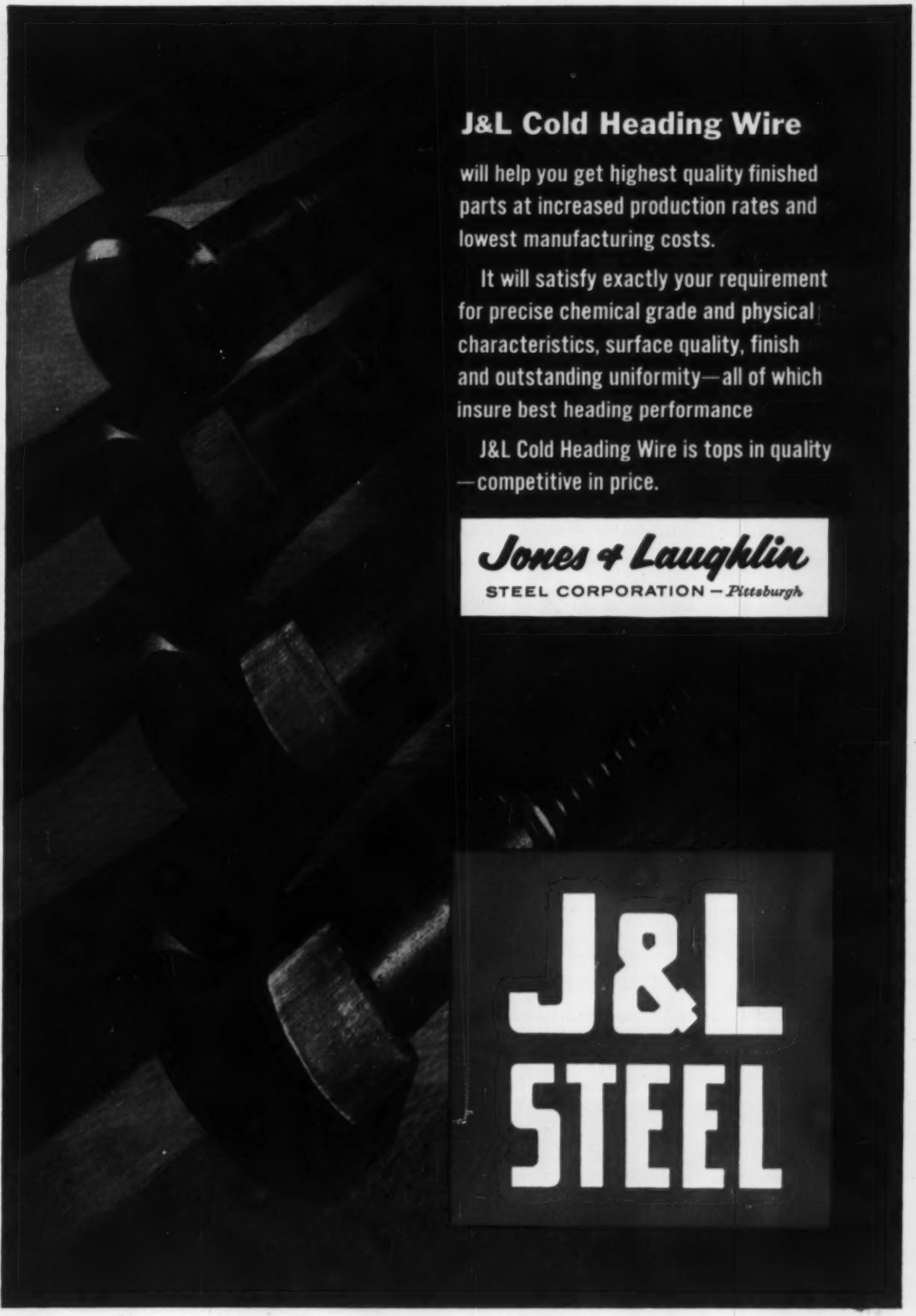
The cut lengths of pipe are given a second sizing and preliminary straightening on a 3-stand sizing mill which is greased with G-1.

Normalizing—From these mills the welded pipe and casing travel to the normalizing furnaces which stretch out for 240 ft and are capable of heating 90 tons of pipe to 1650°F in 1 hour. This is another critical grease application. Here the bearings on the lead tables and the cast iron self-aligning bearings on the furnace are lubricated every day with G-1. At the end of the furnace line, where incandescent pipe is delivered to the cooling tables, it is necessary to use lubricant resistant to extremely high temperatures.

Automatically operated cooling conveyors, the cold sizer, the rotary 7-roll straightener and the runout tables which handle the pipe after normalizing are G-1 lubricated.

Cutoff Tables—The pipe, now of proper dimensions, is put on inspection tables and then transferred to ten cut-off machines where a double-pump, 1000-psi Farval system provides G-1 lubricant to the machines and the cut-off tables which are 64 ft 6 in. long.

Threading, coupling and hydrostatic testing follow. With the exception of the coupling operation, where a Farval system is used, all machinery is greased with pressure guns. After weighing, stenciling and coating, the pipe and casing are sent to the yard, ready for shipment.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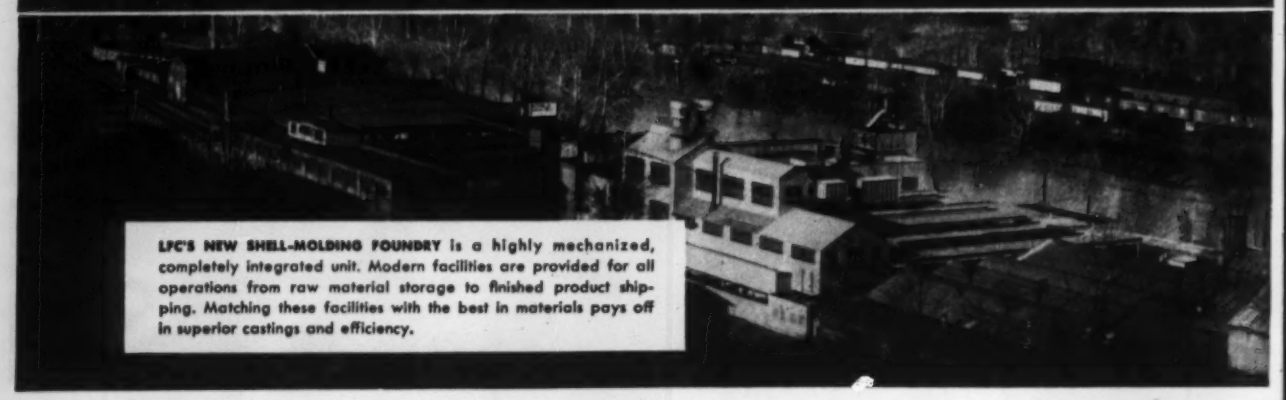
PROOF OF EXCELLENT SURFACE, DIMENSIONAL ACCURACY—This ductile iron sprocket and bevel gear, shown full size, reveals its exceptionally good surface. This, plus very close dimensional accuracy achieved through shell molding, enables final machining to be held to an absolute minimum. The result is a better product at less cost in the long run.

PROOF OF FINE, UNIFORM GRAIN STRUCTURE—An actual cutaway of this shell-molded, ductile iron crankshaft gives a clear demonstration of excellent interior and exterior quality. HOWARD INDUSTRIES, INC., of Buffalo, New York . . . experts in the machining of ductile iron, and for whom this casting is produced . . . says, "Through the use of ductile iron, we can give our customers a crankshaft having a superior finish, tensile strength, yield and elongation characteristics. The end results are longer crankshaft life—therefore, greater economy."



LFC'S NEW SHELL-MOLDING FOUNDRY is a highly mechanized, completely integrated unit. Modern facilities are provided for all operations from raw material storage to finished product shipping. Matching these facilities with the best in materials pays off in superior castings and efficiency.

PROOF:

Chateaugay Pig Iron . . . ideal base metal for shell-molded, ductile iron castings

For years, the Lynchburg Foundry Company, Lynchburg, Virginia, has used Chateaugay—Republic's exclusive premium Pig Iron—for castings requiring outstanding high strength, uniformity and machinability. Further, Chateaugay gave them added benefits through its ability to fill adjacent light and heavy sections evenly, plus a fine and uniform grain structure . . . and an exceptionally good surface with high wear-resistance.

Now, with their new shell-molding foundry in production, Chateaugay Pig Iron has proved to be the ideal base metal for Lynchburg Foundry's ductile iron castings, produced by this modern method.

Basically, Chateaugay's very high carbon and unusually low sulphur, phosphorous and manganese content suit it perfectly for ductile iron use. Beyond this, however, its inherently excellent physical properties are maintained in the ductile form, so that LFC is assured of consistent top quality in every casting. Finally, Chateaugay's naturally good surface and uniform shrinkage characteristics enable LFC to maximize, in each casting, the superior surface finish and closer dimensional accuracy advantages of the shell-molding process.

For the complete story on Chateaugay, the low-phosphorous, copper-free pig iron, call in a Republic Pig Iron Metallurgist. There is no cost or obligation for his services. Simply contact your local Republic representative to let us know when you would like him to call.

NEW, AUTOMATIC SHELL-MAKING MACHINE is typical of the up-to-date methods employed in Lynchburg Foundry Company's shell-molding process. Consistent high-quality production of ductile iron castings is assured through the use of Chateaugay Pig Iron as the base metal.

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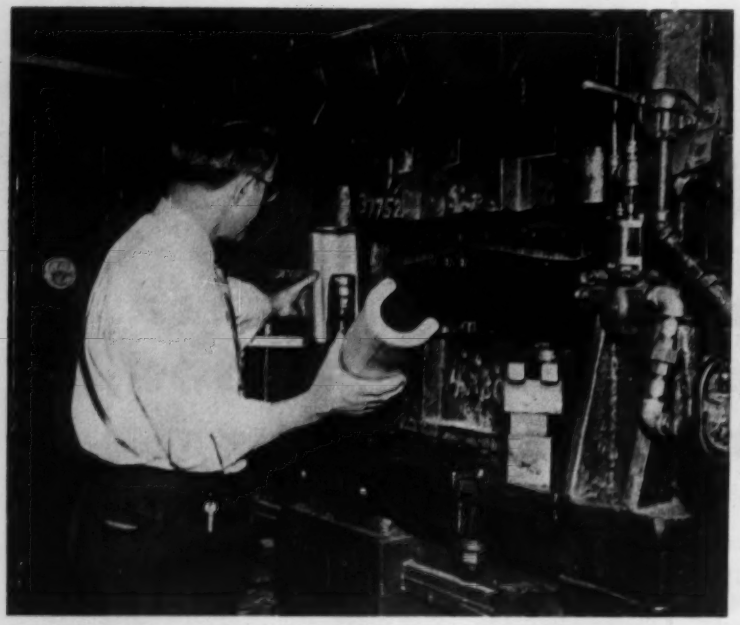
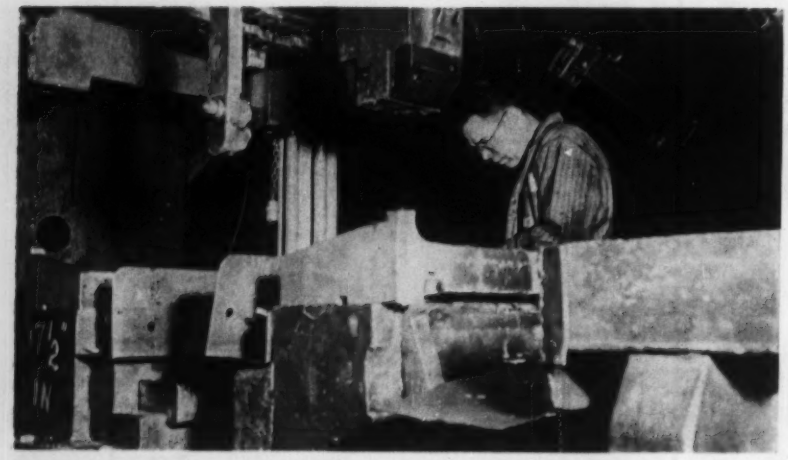


U-shaped blocks are inserted around guide pins

Removing block from storage position automatically cuts off power

Safety Blocks Muzzle the Press



With safety blocks in press opening, workman is fully protected

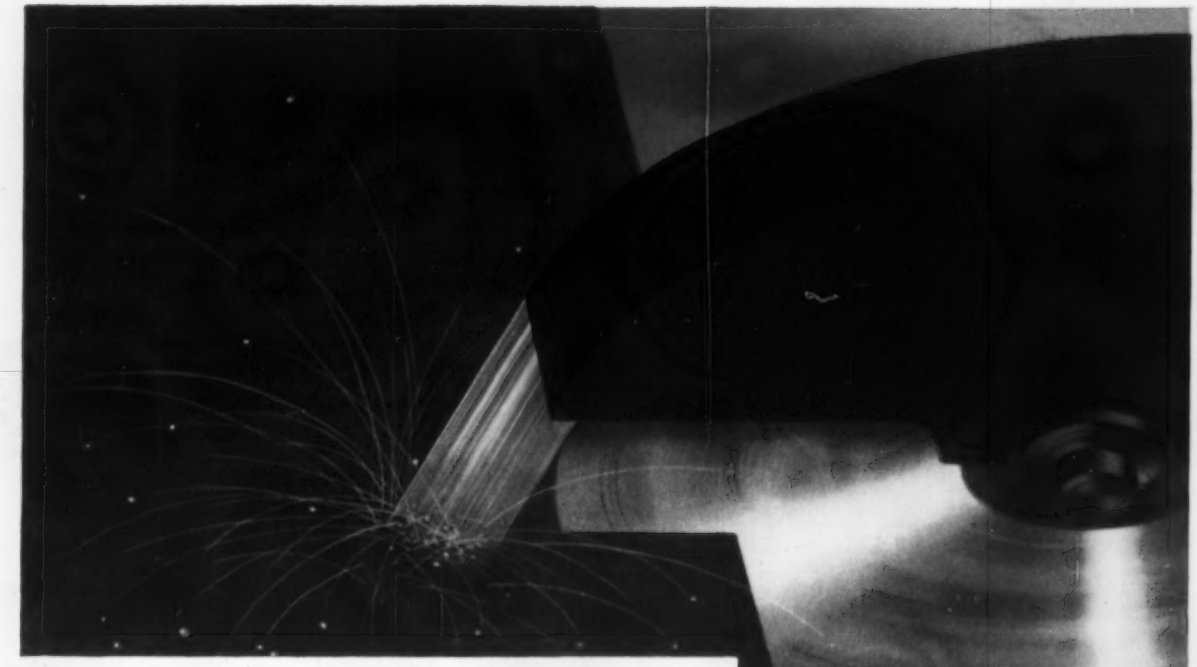
BLOCKING the press opening whenever an operator or repairman is working under the ram is solid safety practice. But, too often, anything handy, a piece of wood or a scrap of steel, is expected to do the job. One company is making permanent safety blocks of lightweight magnesium.

Power Cutoff—Attached to the block is an electrical plug. When the block is in its storage position at the side of the press, the plug is inserted into an electrical receptacle which closes the power circuit to the machine.

When an operator removes the block to put it in the press, he has to pull the plug and all press power is cut off. This power disconnect system also makes sure the safety blocks are available at all times.

Why Magnesium? — Blocks are made of magnesium because of the metal's light weight and high impact strength. It is easily extruded, which results in low-cost, special shapes. Most important, it has guaranteed minimum strength.

Safety blocks come in a variety of sizes and shapes and can be used in hydraulic or mechanical presses. One or more blocks are used in each press, depending on the capacity and dimensions of the machine. They are made by Magline Inc., Pinconning, Mich.



Maybe LEVINSON has the steel you are looking for!

Steel warehouses everywhere are having difficulty maintaining a well rounded stock. However, many steel buyers have found that the very item they have not been able to get elsewhere is in the Levinson warehouse! If the steel you need is not available Levinson may be able to pick up the item for you or offer a suitable substitute.

Levinson has complete facilities for shearing, sawing, and flame cutting as well as drilling, welding, riveting and forming. So, whatever your problem, call Levinson with the assurance they will do everything possible to help you.

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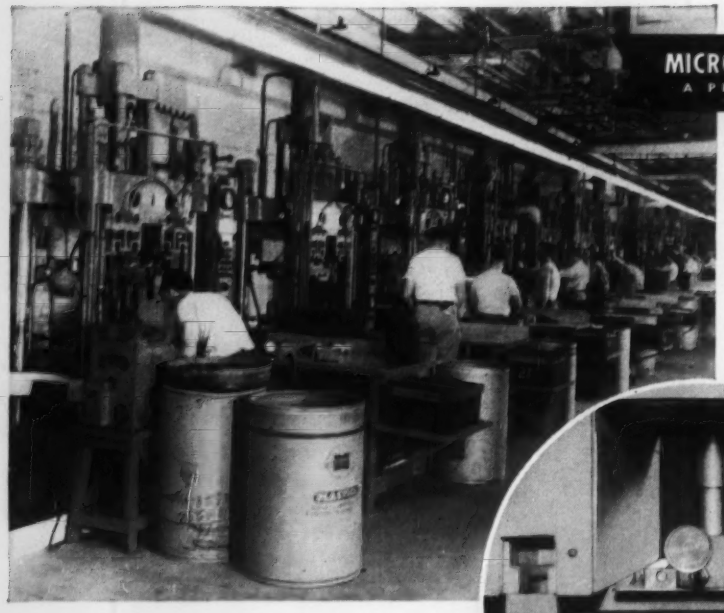
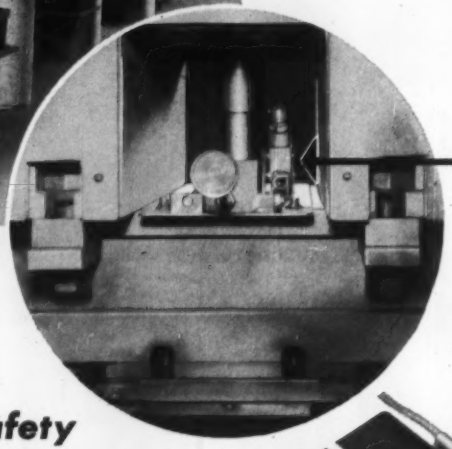
A PRINCIPLE OF GOOD DESIGN



Battery of 200 ton transfer molding presses on which MICRO SWITCH switches were installed to provide additional safety, reduce operator effort and speed up production.



Simple actuating device eliminates reaching into the hot press mold to set plastic preforms in position. High temperature switch operates within confines of the mold.

Plant Engineer uses snap-action switch

to { *provide additional safety* / *reduce operator effort* / *speed up production* }

on 200 ton transfer molding presses

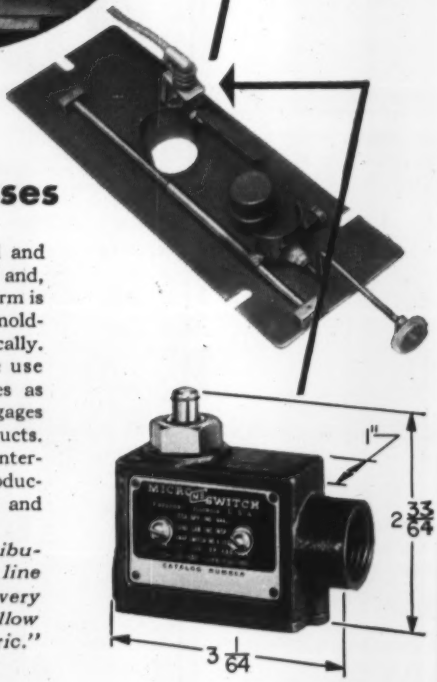
PROBLEM—Preheated plastic preforms were manually placed in the hot mold of the 200 ton transfer molding press. The operator then withdrew his hand to operate the control switch on the side of the press to start the molding sequence. Hand and arm were exposed to burns and injury from accidental ram operation.

SOLUTION—The plant engineer installed a plunger actuated switch within the mold and wired it into the ram control circuit. He made the special device (shown) with which to push the plastic preforms into proper position in the mold and, at the same time, operate switch to start the ram motion.

RESULT—The operator's hand and arm are never in the danger zone and, with one motion, the plastic preform is positioned in the press and the molding sequence started—automatically.

Plant engineers everywhere use these long-lived, precise switches as automatic checking controls and gages to insure quality of finished products. They use them as limits, safeties, interlocks and controls to increase production efficiency at minimum cost and with maximum safety.

There is a MICRO SWITCH *Distributor near you with a complete line of snap-action switches for every requirement. Look in the Yellow Pages under "Switches, Electric."*



A complete line of snap-action and mercury switches

MICRO SWITCH provides a complete line of extremely reliable, small-size, high-capacity, snap-action precision switches and mercury switches. Available in a wide variety of sizes, shapes, weights, actuators and electrical characteristics. For all types of electrical controls.

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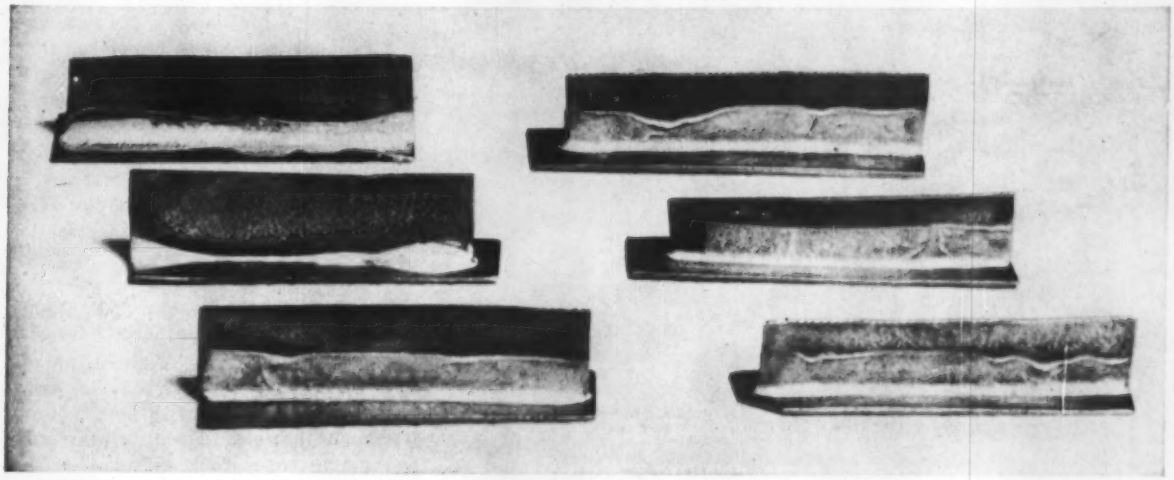


Production brazing T-bars is a step toward better knowledge of . . .

How To Form Zirconium

THE NEW MEMBER of the royal family of corrosion resistant metals is strong as steel and nearly 20 per cent lighter.

The first cousin of titanium and hafnium, zirconium is finding a place in chemical equipment, plating plants, hydraulic systems, surgery and atomic energy, to name only a few. Any day you may get an inquiry about machining, forming or fabricating it. When you do, here are some tips.

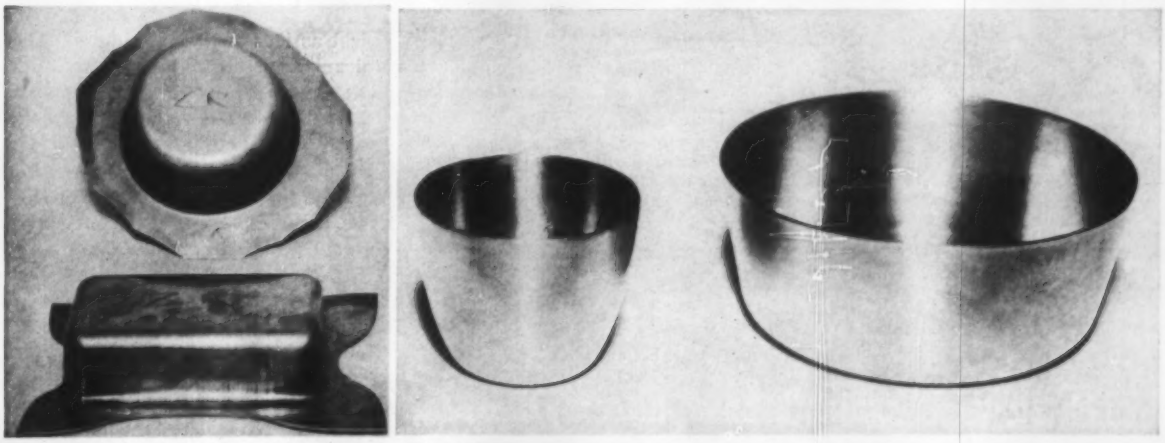
Forming—Take a look at STEEL's latest article on forming stainless steel and use the chart for equipment selection (Nov. 14, p. 114). The same equipment and methods can be used for zirconium.

Like stainless, soft zirconium work hardens fast, and if any cutting is necessary, tools must be kept sharp.

Machining—Coolants are widely used, although dry machining can be done at 100 sfpm, a cutting depth of ⅛-in. and a feed of 0.032 in. per revolution.

The best tool is tungsten carbide, but high speed steels are good. Use 10 degrees of front clearance, 7 degrees of side clearance and 0 to 10 degree side and back rakes for all cutting tools.

Drilling and grinding require slower operating speeds than are



Zirconium crucibles and deep dishes like these are drawn in a single operation at 650 to 800 F. Plenty of colloidal graphite lubricant prevents seizing

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common for steel. If you are grinding zirconium, remember that in common with aluminum and brass it will load up the wheel. Softer bonds are called for, so consult the grinding wheel suppliers for the best grades.

Zirconium is quite ductile. Die design practices for magnesium and titanium work well for cutting, drawing and forming.

Deep Drawing—Use 650 to 800° F and colloidal graphite lubricant for best results. A single operation will produce a deeper draw than is possible with steel, aluminum or brass. Deep drawing in a single operation eliminates the need for staging dies and intermediate annealing.

Brazing and Welding—Zirconium absorbs and unites with oxygen, hydrogen and nitrogen at high temperatures. Welding and brazing must be protected by an inert gas, such as argon or neon, although spot welding is successful without such protection. A successful method of continuous furnace brazing with silver or silver-manganese alloy has been developed for production use.

This article was prepared with the help of Brooks & Perkins, Detroit

Forging — Fortunately, forging temperatures are well below the critical temperatures for gas absorption. Zirconium ingots can be forged at 1600°F.

The forging rate is not so critical as it is with magnesium. Hydraulic presses, steam and air hammers are equally successful. Initial working should be done with light blows to break up the cast structure.

Rolling and Extruding—Hot rolling will produce gages of 0.040 to 0.050 in. In cold rolling, the most rapid work hardening occurs during the first 10 to 20 per cent of reduction. The rate is much slower thereafter.

Rods, tubes and shapes are successfully extruded, but take precautions to prevent seizing by using colloidal graphite as a lubricant.

The Average Shop Needs and Now Can Afford

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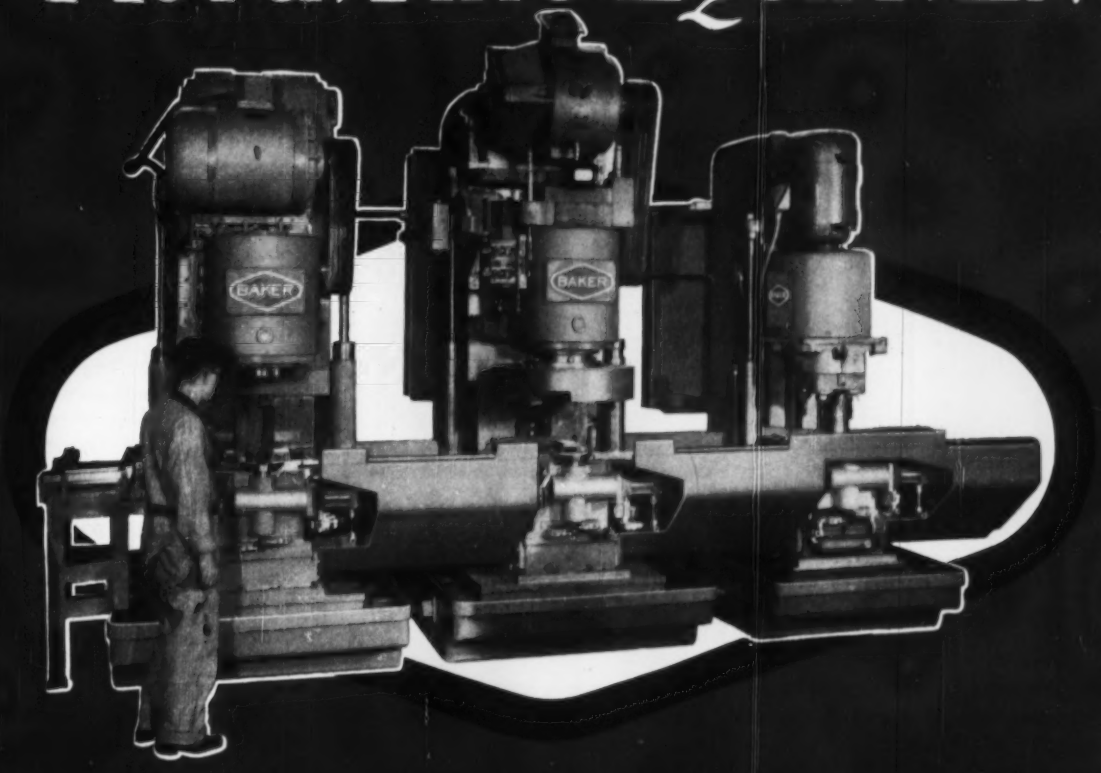

The new three standard unit Baker Machine introduced at the show, is combined to operate as a transfer machine, set up with a low cost, simplified fixture, proving the possibility of providing automatic machines through use of STANDARD MACHINES . . . . And thereby achieving automation without tremendous expenditure. Operations on the new Baker Transfer are Combination Bore & Counterbore . . . Face (cross feed) . . . and Multiple Drill . . . All Automatically. Write regarding your specific job problems.

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Timing mechanism tubes come from the nickel alloy plating bath at the Century Plating Co., White Plains, N. Y.

Tin-Nickel Alloy Shows Plating Promise

TIN-NICKEL, a little known plating alloy, is getting a start in this country at the Century Plating Co., White Plains, N. Y. The Tin Research Institute in England developed the 65 per cent tin, 35 per cent nickel process.

Its versatility has been proved by use in plating products ranging from timing mechanism parts to 180-lb valves for the chemical industry.

Advantages — "Wherever corrosion, friction or increasing the service life of parts is a factor," says Louis Morin, sales engineer and chief plater for Century, "tin-nickel alloy plate has advantages." He lists some of them as:

Corrosion Resistance: Equal to nickel chrome and superior to either tin or nickel where these are considered in handling acids, alkalies and organic materials. Nontarnishing.

Hardness: 600-700 Vickers Pyramid Number. Despite its hardness, thicknesses up to 0.012 in. will withstand grinding without cracking.

Bearing Qualities: Tin-nickel plated brass gear trains resulted in a 20 per cent reduction in friction.

Solderability: Solders readily with a noncorrosive flux with lead-tin base solders.

Color: Chrome-like with a slight pinkish cast which makes it an excellent color match with stainless steel.

Another attribute is exceptional throwing power. Regardless of the size or shape of the item being plated, whether in barrel or still tank, tin-nickel penetrates the deep recesses with ordinary plating procedures. It has relatively flat plating distribution which permits precision thickness control.

Problem Solver—One production problem solved by Century with tin-nickel was a tubular case containing a timing mechanism checking device used by jewelers and the military. The containers are made of steel and brass and have open ends for the insertion of the timing mechanism. The ends were then capped and sealed with solder.

The tin-nickel plating on the case had no tendency to discolor, besides being nonmagnetic, noncorrosive and adaptable to soldering.

Pickaback Transfer

Robot car carries pallet of production parts through many operations

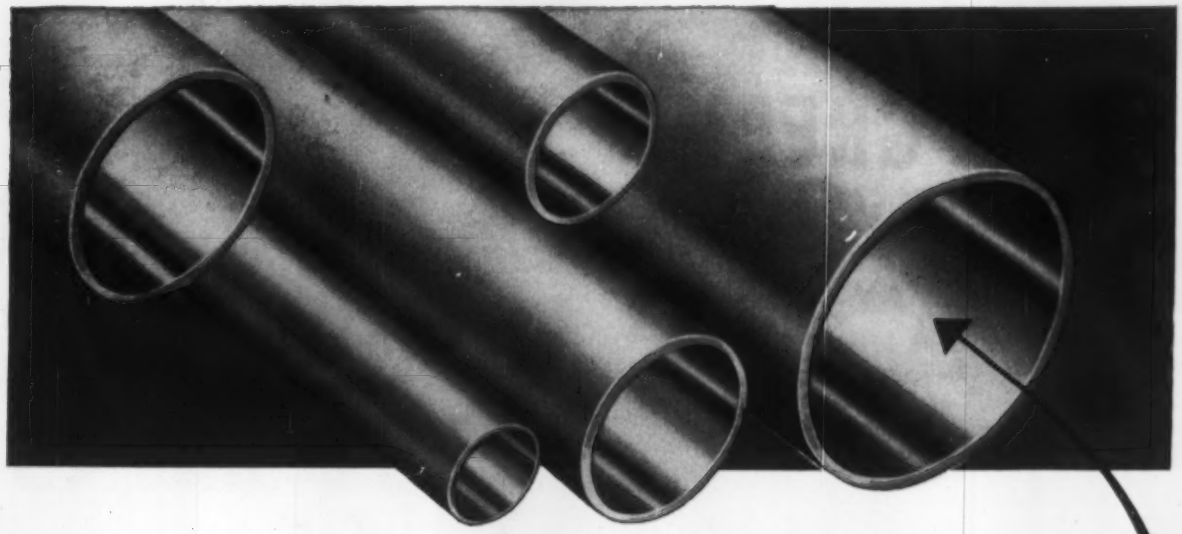
TRANSFORMER impregnating is made faster and easier at GE's Fort Wayne, Ind., plant because of an automatic transfer robot. Built like a small flatcar, it carries another car on its back to load and unload a pallet of transformers through a series of ovens and impregnators.

Features—Once the operation is started, the car carries its load through the complete cycle without further prompting. A pallet placed on the top car moves into a preheating oven at the first station. After the preheating period, the robot unloads the oven and at preset intervals continues to load and unload the pallet at the successive stations.

Tracks run past the loading doors. As the bottom car moves itself into position, the top or pickaback car can place the pallet on either side of the track. Hydraulically operated screws furnish the vertical movement needed to pick up or set down.

More Uses—Many other applications are expected because the car moves in six directions in three dimensions: up and down, forward and back and from side to side.

All movements of the car are electrically controlled. Limit switches can position the car to within $\frac{1}{8}$-in.



J&L cold drawn ELECTRICWELD tubing now available with a superior SPECIAL SMOOTH I.D. finish

Reduces your over-all production costs in applications like these . . .

- **cylinder tubing**
- **hydraulic and pressure tubing**
- **shock absorbers**
- **ordnance components**

This new drawn-over-mandrel grade tubing with its mirror-like inside surface finish is today busy helping manufacturers reduce or entirely eliminate costly machining on many applications and is being substituted for more costly types of steel tubing. For example, it may be used, without inside honing, for many cylinders through which plungers are passed.

J & L Cold Drawn ELECTRICWELD Tubing with a *Special Smooth* ID finish combines the physical advantages imparted by today's modern electric welding techniques with those of cold working. It withstands high internal hydrostatic pressures, carries heavy torsion loads, resists high-frequency vibration, and offers a favorable weight-to-strength ratio for applications in which loading occurs in all directions.

J & L Cold Drawn ELECTRICWELD Tubing can be furnished in its three specifications in OD sizes from ¼-inch to 2¼ inches and in wall thickness from 20 to 10 gage, 0.035 and 0.134-inch respectively.

This new booklet provides the information you need . . . specifications . . . tolerances . . . chemistry . . . mechanical properties . . . annealing . . . finishes.

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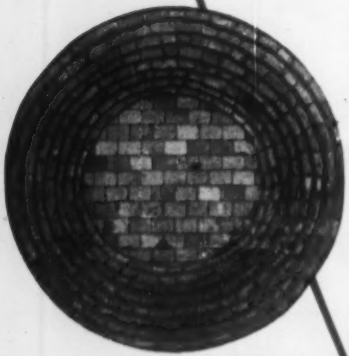
The exceptional properties of KX-99 brick enable them to better withstand erosion and slag action. Uniformity of size permits laying up KX-99 with very thin joints to better withstand the scouring and washing action of molten metal.



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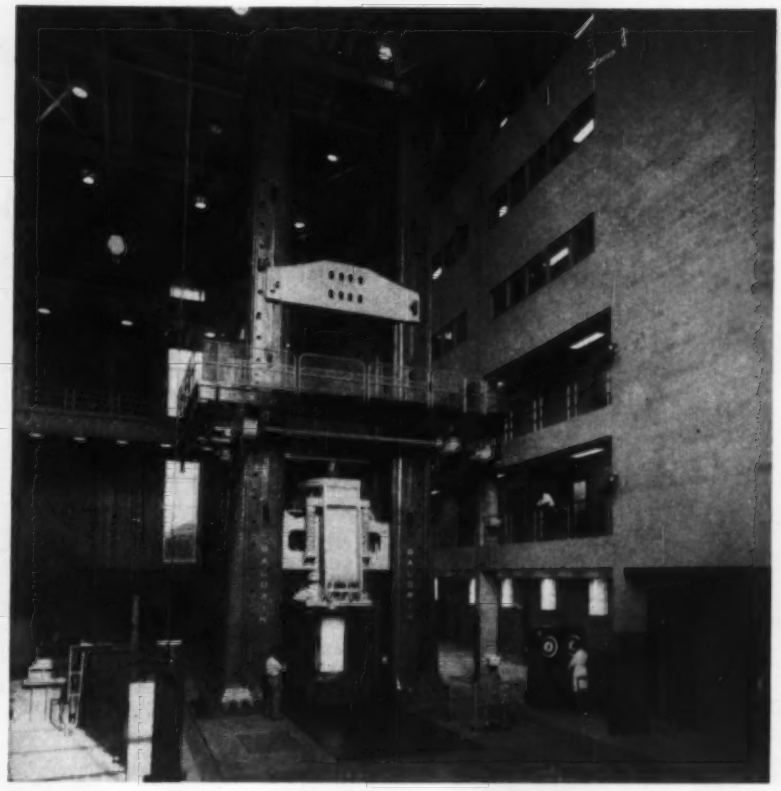
A. P. GREEN FIRE BRICK COMPANY, LTD.
Toronto 15, Ontario



Operation Big Test

EXPERIMENTAL STUDIES, heretofore unfeasible, can be made with the 5-million-ton capacity, universal testing machine installed at Fritz Engineering Laboratory, Lehigh University, Bethlehem, Pa.

Specimens or structures up to 40 ft high can be tested in tension above the sensitive crosshead. Below the crosshead, the unit can handle structures up to 100 ft long, 40 ft high and nearly 10 ft wide in compression tests.

Significance—The high-capacity machine will make design information from tests on large structures available to engineers. These data will eliminate much of the theoretical extrapolation of test results from sample or cut specimens.

Testing of complete structures will give information on varying properties throughout large rolled sections or forgings. It can reveal points of high stress that cause structural failure.

Operation — Loads are applied hydraulically by a movable cylinder on a stationary piston, mounted on the base of the machine. The cylinder carries two vertical screws through which loads are applied on test specimens. They are in tension under a test load.

The load-measuring system is hydraulic and independent of the loading system. Guaranteed accuracy is within 0.5 per cent of the dial reading. Load variations as small as 20 lb can be indicated.

Other Equipment—The laboratory also has an integrated set of jacks, pumps and load measuring devices for applying and measuring repeated loads on structures and machine parts. They make it possible to study the behavior of structures under conditions approximating service. This equipment was made by the Amsler Co., Schaffhausen, Switzerland. The universal tester was built by Baldwin-Lima-Hamilton Corp., Philadelphia.

MORE RIGID

...yet it costs less to make from welded steel

THIS base for a precision drilling machine shows what benefits can be realized by proper design for welded steel.

40% less material is now used . . . yet the design is considerably more rigid. Alignment tolerances of .017″ on the original base are held to .002″ in the welded design.

The cost is considerably lower than the original cast construction.

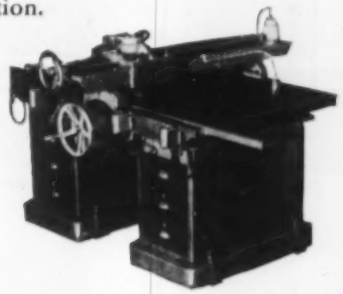


Fig. 1. Welded Steel Base *for Wales-Strippit Company, N. Tonawanda, N. Y. Designed using the Lincoln WELDesign System.*

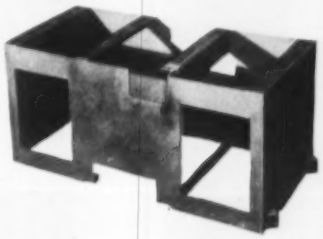


Fig. 2. Former Design *had cast sections that were shipped in parts and aligned in customer's shop.*

Savings like these can be duplicated on your products. Have a Lincoln representative show you how to benefit. Write.

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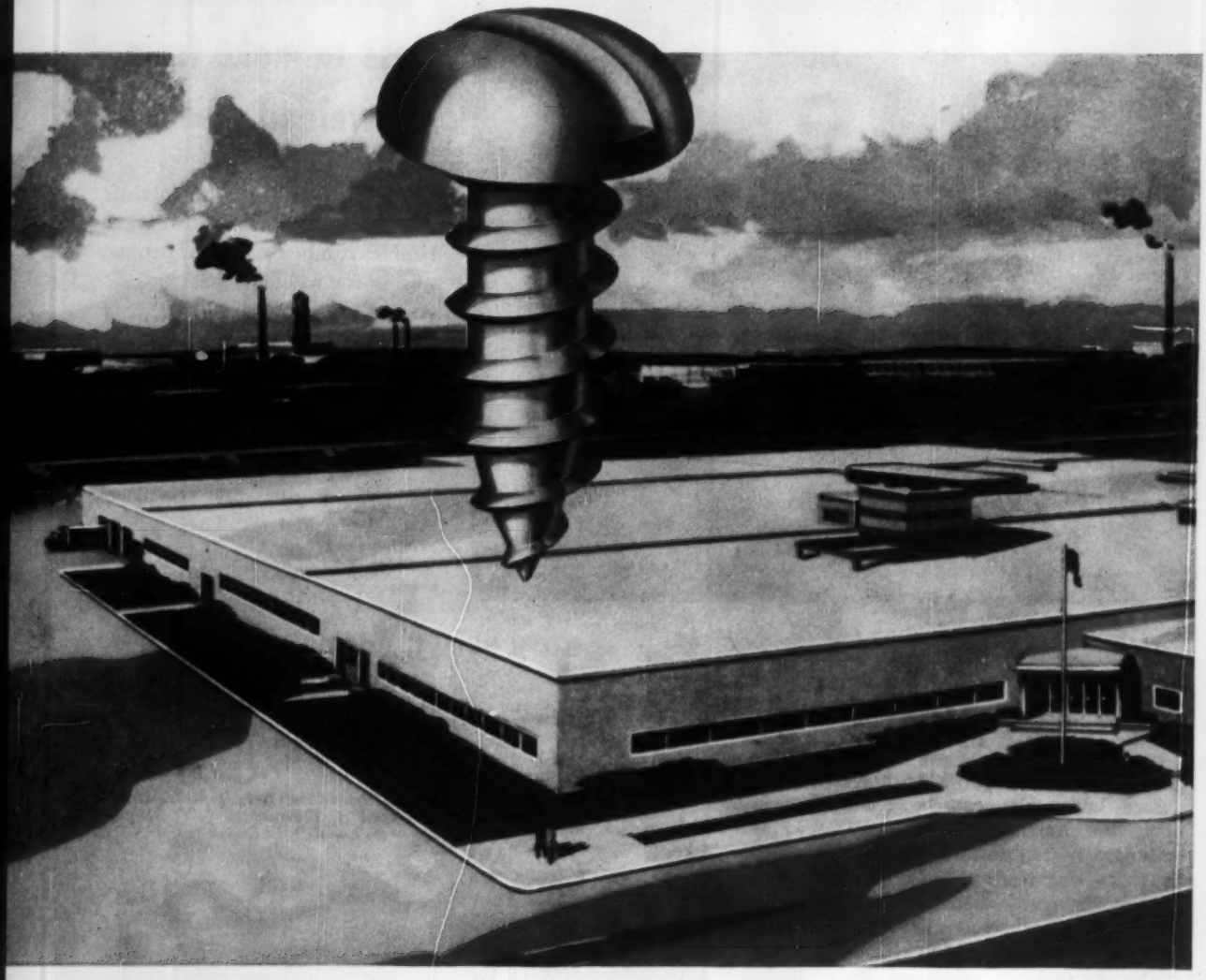
Dept. 1109 • Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

the new PARKER



IN CLIFTON, N. J. About 10 miles from New York City.

267,000 SQUARE FEET of floor space, with 225,000 sq. ft. for manufacturing: the remainder for offices, shipping, etc.

PRODUCTION-FLOW DESIGN Single-floor layout that permits progressive flow of products through processing operations.

MECHANIZED MATERIALS-HANDLING Special conveyor systems and other modern equipment provide advanced degree of automation, and speed production.

AUTOMATIC HEAT TREATING equipment, of P-K design, is typical of new production facilities for highest efficiency.

ADVANCED QUALITY CONTROL Newest inspec-

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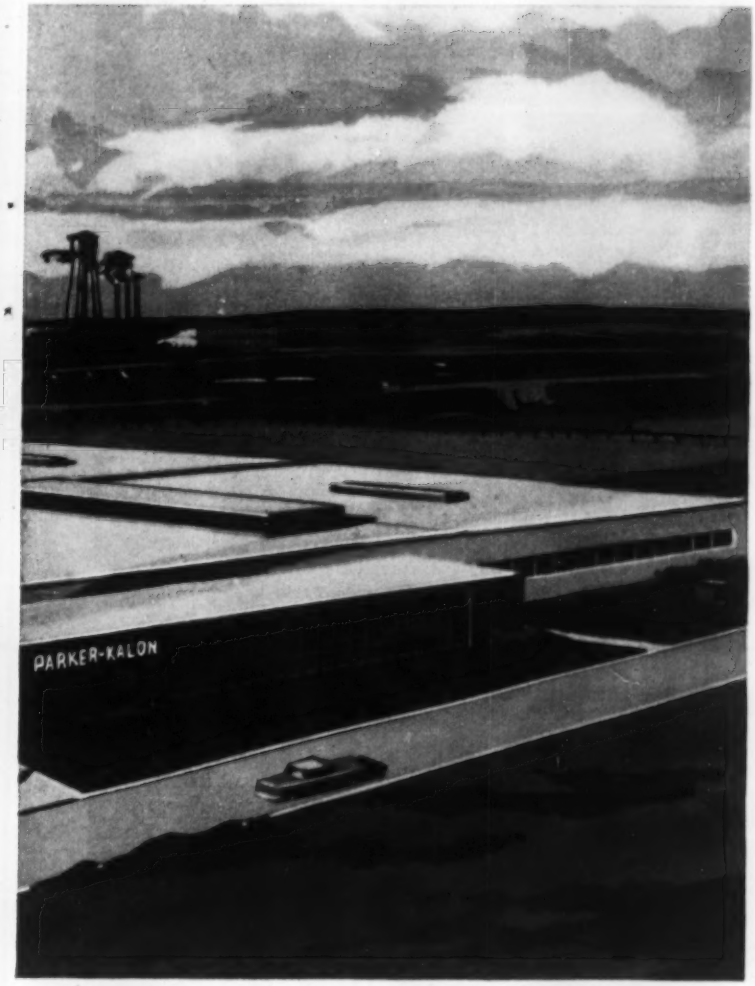
-KALON® plant . . .



Production facilities matched with an unequalled experience . . . to offer you more assembly savings

Starting with a revolutionary idea, the *original* Sheet Metal Screw, Parker-Kalon has become the leading manufacturer of Self-tapping Screws and other fasteners essential to low-cost assembly of thousands of the nations best-known products.

Industry's reliance on Parker-Kalon has brought about this growth, and the new Parker-Kalon plant, in a real sense, was built to your specifications.

In this great new plant, P-K Fasteners will be produced in larger volume to meet steadily increasing demand. Advanced engineering facilities will also contribute to P-K progress in research and development.

Parker-Kalon's unequalled "know-how" is now matched with the finest facilities for all operations. Now, more than ever, you can be sure . . . "If it's P-K . . . it's OK!"

tion and testing equipment guards P-K quality standards.

PACKING AND SHIPPING area is fully equipped for rapid handling of large stocks and shipment of orders.

AIR-CONDITIONED LABORATORY provides all modern requirements for research, fastener development, and performance tests.

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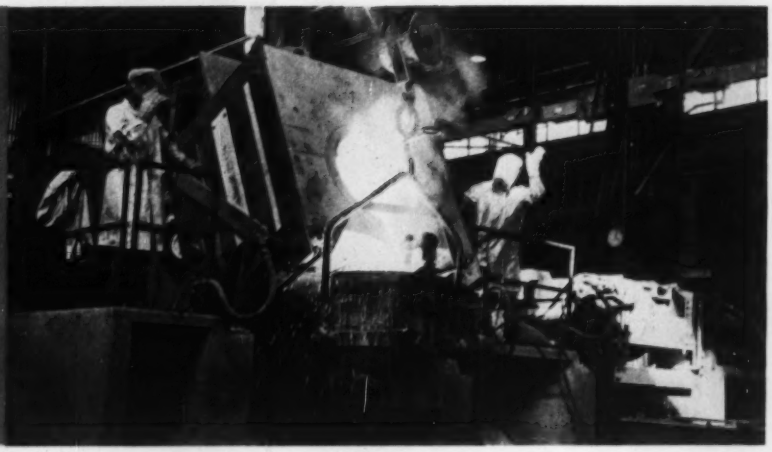
General American Transportation Corporation, Clifton, New Jersey

Sold through leading Industrial Distributors

STAPS* • WING NUTS • THUMB SCREWS

*Registered Trade-mark

The key to advanced design in many products is improved metals. Westinghouse hopes to get them faster because at Blairsville, Pa., its . . .



Three induction melting furnaces, varying from 3000 to 5000 lb, are used to make ingots of special alloys

Pilot Plant Links Lab to Production

THE NEWEST thing in metal development is a team of specialists working with production equipment to close the gap between test tube and manufacturing. This is the reasoning back of the $6-million metal pilot plant opened by Westinghouse Corp.

The plant can process both wrought and cast alloys with equipment which is both flexible enough and large enough to simulate actual manufacturing conditions.

Factory, Too—Blairsville differs from most pilot plants because it turns out a moderate amount of production parts.

"Equipment is larger than that

Messrs. Sam Damon and D. Rabenold are metallurgists in the materials manufacturing department. In this article they tell why...

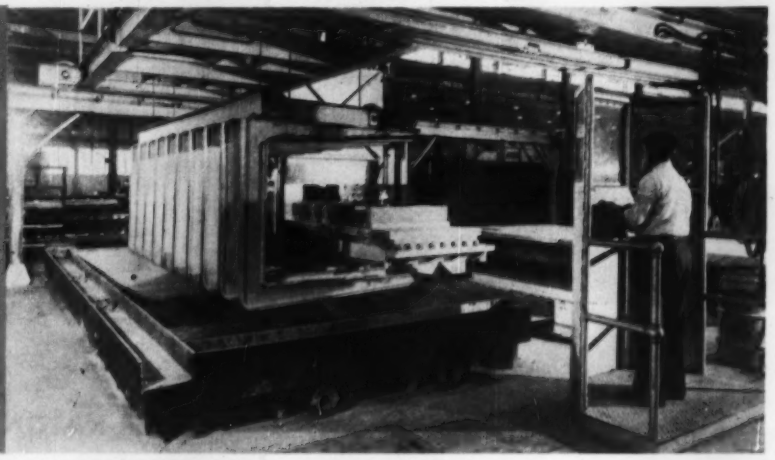


Fig. 1—High temperature solution heat treating furnace moves load from furnace into either oil or water quench tank in 20 seconds

Heat Treating at Blairsville Is Versatile

A METALLURGICAL facility like ours requires a variety of furnaces. Often, the right kind of heat treating is the answer to supermetals with extraordinary properties.

Example: Alloys of large cross section, with homogeneous properties throughout. Since mechanical working alone cannot do this, metallurgists use precipitation hardened alloys. They require 1 to 2 hours of heating at 1800 to 2200° F for the solution of alloying elements.

This is followed by an aging treatment. The solution treated metal is held for 16 to 50 hours at 1200 to 1400° F. Some applica-

found in most pilot plants," says Warren M. Trigg, manager of Westinghouse's materials manufacturing department. He explains: "This permits the manufacture of special metal products at competitive costs. More work is done by tools which normally cannot be fully loaded on development work.

"This operating policy not only lowers the cost of development work but also provides trained operating crews for all equipment—an important consideration for effective pilot plant service."

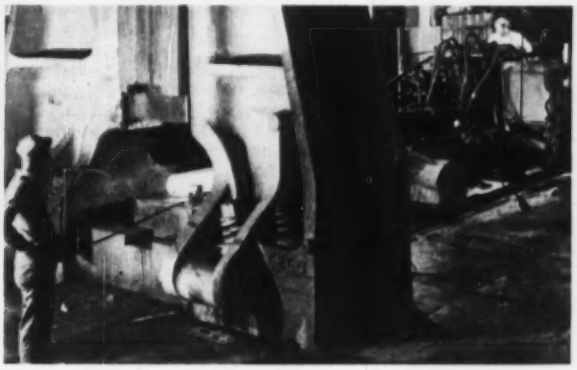
Proof of Pudding—The manufacture of sizable quantities of a new product usually will reveal many problems that do not come to light by any other method, explains Mr. Trigg, adding:

"The discipline of meeting production schedules proves the practicality of new processes. Demonstration in production equipment minimizes problems when the process is transferred to a supplier's plant."

Fields—Although the facility has been generalized to satisfy Westinghouse requirements for some years to come, work at present will be concentrated on high temperature materials, hard and soft magnetic materials, expansion and resistance alloys, special foundry and powder metallurgy processes and nuclear fuel element manufacturing techniques.

Hot metal goes into shell molds to make specialty parts or to try out process for new use

This 18,000-lb forging hammer is designed for both open and closed die work



tions call for a double age where a slightly lower temperature treatment is given to stabilize properties.

Equipment — Fig. 1 (left) shows the natural-gas-fired, car-type furnace we use for solution treating such alloys. It is rated at 7 million Btu per hour and has a top temperature of 2400° F. Charges 18 ft long, weighing up to 10,000 lb, can be treated. Design of the car and overhead crane permits a charge to be removed from the furnace and lowered into either a water or oil quench in 20 seconds, to insure proper solution treatment.

In small batch solution treatment of age hardening alloys for experimental or control purposes, we often use the flexible facilities of our controlled atmosphere furnaces. Example: A special heat of Discaloy (a Westinghouse, high-temperature, iron-base disc alloy) may require temperatures differing from the standard heat treatment.

The right temperature and time can be quickly found in these smaller furnaces. They are Globar heated, will go up to 2550° F and are supplied with a choice of controlled atmospheres.

Lower Temperature—A furnace that goes to 1800° F is used for aging. It holds the same size charge as the solution treating furnace. With special programming controls, any combination of temperature rise, soak and temperature fall can be obtained.

Temperature control of ±5° F is needed for high temperature alloy aging. Discaloy discs are aged 20 hours at 1350° F, cooled in 5 hours to 1200° F, followed by 20 hours at 1200° F.

With these furnaces, engineers can verify laboratory test results on a larger scale. They can get the accurate control needed to produce quality material.

Steel Heat Treating — Although Blairsville is primarily set up to handle special alloys, some work is done on forging and heat treating common SAE steels. The furnaces described are used also in the usual operations of heating for quenching, normalizing, annealing and tempering.

By adjusting the heat input, steel forgings can be heated at various rates and quenched rapidly at the proper time. Annealing, normalizing and tempering are accurately controlled.

Coils—We use cylindrical, batch-type bell furnaces (Fig. 2) in bright

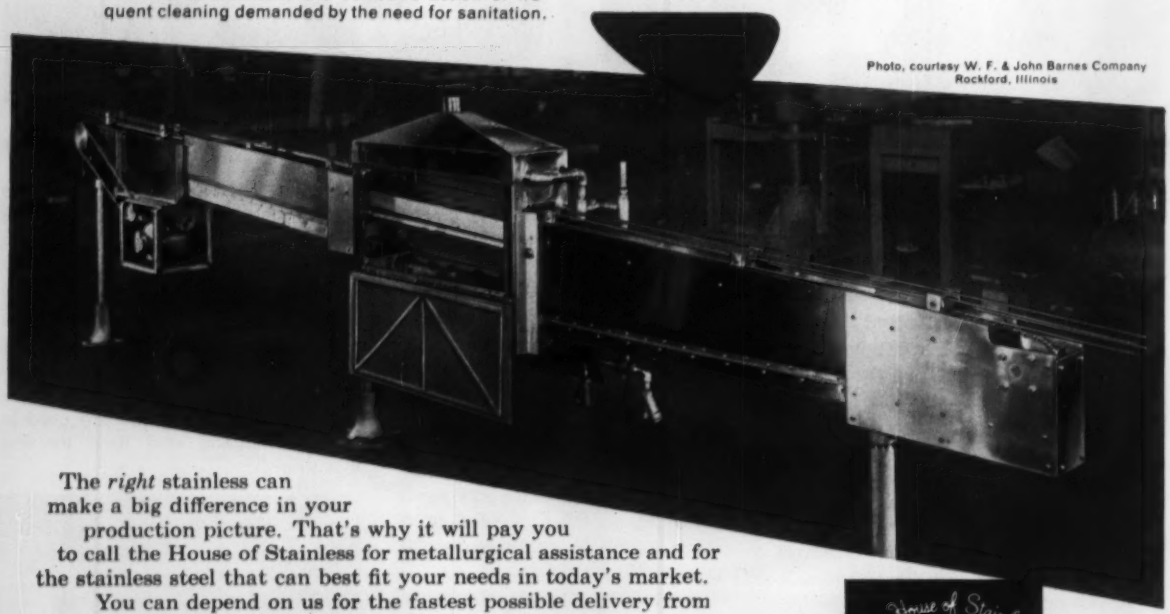
Fig. 2—Bell-type furnaces are used in bright annealing and heat treating thin strip

There's STAINLESS for Infants, too!

How the *Right* Stainless Safeguards Both Product and Equipment in the Handling of Baby Foods

THE NEED • When W. F. & John Barnes Company, custom builders of process equipment, were commissioned by a leading meat packer to design special conveying and washing machinery for the handling of canned baby foods, they had to meet all-important sanitation conditions. The washing chamber required material that would stand up under constant exposure to moisture and heat in performing its primary function. Likewise, the entire unit had to withstand the corrosive action of frequent cleaning demanded by the need for sanitation.

THE ANSWER • Here was a "natural" for stainless, but with so many different types available, Barnes engineers wanted to be sure that the proper grade and type was used. They turned to the House of Stainless to recommend the specific stainless that would best meet these severe conditions.



Photo, courtesy W. F. & John Barnes Company
Rockford, Illinois

The *right* stainless can make a big difference in your production picture. That's why it will pay you to call the House of Stainless for metallurgical assistance and for the stainless steel that can best fit your needs in today's market.

You can depend on us for the fastest possible delivery from warehouse stocks or mill shipments through our mill placement department.

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annealing and in developing heat treatments for thin gage strip. With charge dimensions of 36 in. in diameter and 48 in. high, up to 3000 lb of coiled metal can be processed at one time.

Electrically heated and controlled by a combination of electronic contactors and chart recorder-controllers, these furnaces are held to ±5° F. Atmospheres of Ammogas (dissociated ammonia), hydrogen and nitrogen are interchangeable. With standard drying equipment, a dew point of −60° C can be reached. By passing the gas through "wetters," a water saturated gas is obtained which is effective in decarburization.

Vacuum — We plan to install vacuum annealing furnaces for heat treating reactive metals such as titanium and zirconium. This technique might also be applied to strip materials which would benefit from surface purification of the vacuum treatment.

Also being considered are intermediate-size, pit-type furnaces and equipment for vertical quenching needed for hardening straight shafts and other parts of high length to cross-section ratio.

Atmosphere — The bright heat treating of stainless and tool steels and bright annealing and heat processing of other oxidizable alloys call for special control of atmospheres.

For example, martensitic stainless Type 410 requires a dry (−40° C dew point) Ammogas atmosphere or hydrogen for bright hardening. A battery of muffle furnaces and several Bell furnaces are used.

A number of conventional, brick-lined furnaces are used in treating standard grades of air, oil or water hardening steels. Generally, the atmosphere used is Endogas (a mixture of gases, with carbon pressure in equilibrium with carbon content of the metal being treated).

Forging and Rolling—Furnaces used for forging and rolling are gas fired, using natural gas with a sulphur content of less than 0.1 grams per 100 cu ft.

Clean atmosphere for heating is obtained which can be adjusted for oxidizing and reducing conditions. Temperature control maintains ±10°F throughout the furnace charge space which measures 10 x 7 x 4 ft.

Close control of temperature and atmosphere is important in producing special alloys for magnetic, electrical and high temperature applications. Aside from the main requirement of getting material hot enough to deform plastically (without excessive surface defects), there is the all-important requirement of grain-size control.

Most of these special alloys are later cold worked or heat treated. The grain size resulting from hot forming is important in determining final grain size and properties.

Surface Treatment — Treating metals for needed surface properties is another field in which we are working.

Gas carburizing is carried out in batch-type or continuous furnaces. Controlled carbon pressure by the use of Endogas or Monogas permits pilot plant work in recarburization and the prevention of carbon loss during annealing or hardening.

The same furnaces using the same gases are available for development work on carbonitriding or bright annealing.

A pit-type furnace is used for nitriding, as well as for controlled atmosphere aging and tempering. Ammonia requirements are met by a 13,000-gallon storage tank.

The protective atmosphere requirements of aging and tempering treatments are met with Exogas—its ratio is altered to suit needed conditions of carbon potential and dew point.

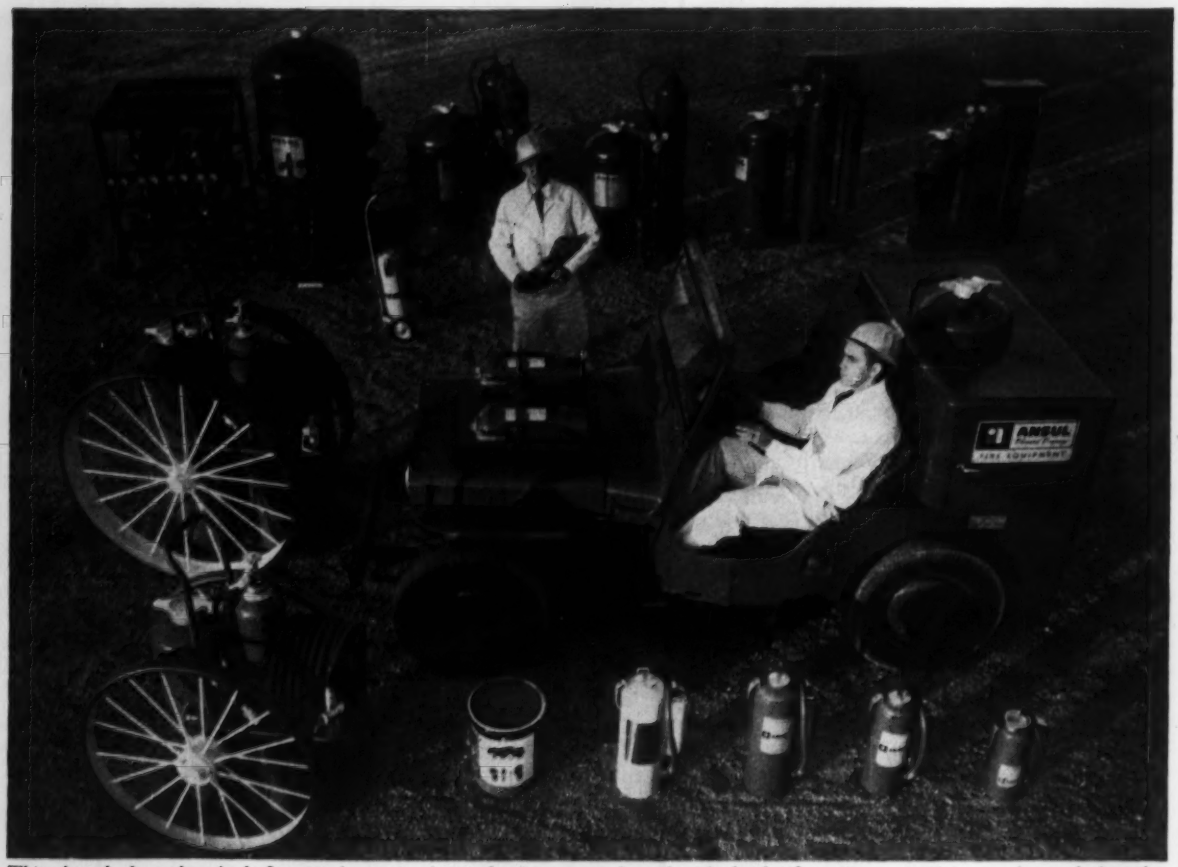
Brazing — We are interested in exploring economies that can come from full utilization of furnace brazing techniques. Here, new alloys, difficult to braze, as well as untested high temperature brazing alloys, are examined critically; special methods and atmospheres are devised to use them on a production basis. Where available atmospheres or fluxes do not meet requirements, it is possible to carry out vacuum brazing tests.

Sintering — Our powder metallurgy department can sinter parts at high rates, using a two-zone, mechanical, pusher-type furnace (Fig. 3).

For the development of new sintered alloys and special contact materials, a high temperature molybdenum element furnace is used. It goes up to 3270° F. Ammogas is the atmosphere generally used in the powder metal section. However, here, as in the entire heat treating pilot plant, a manifold system will feed any atmosphere to any furnace.

Fig. 3—Pusher-type furnace is used in powder metallurgy and brazing. Special furnaces (background) are used in development work

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



The Ansul dry chemical fire equipment pictured above includes portable hand units, wheeled and stationary units and a jeep installation. Ansul also manufactures automatic dry chemical piped systems, custom engineered for the hazard. Ansul equipment is listed and approved by Underwriters' and Factory Mutual Laboratories.

Only Ansul offers a Five Year Equipment Warranty

Your assurance of fast, dependable fire protection

For you, the buyer of fire equipment, Ansul's important 5 year warranty means many extra years of fast, dependable protection. It also means freedom from costly maintenance checks and repairs.

Special design and construction features make this warranty possible. Ansul's *weather-tight* construction keeps out moisture, resists corrosion. *Patented nozzles* deliver the right kind of stream for your hazard. A *sealed pressure cartridge* puts Ansul's "Plus Fifty" dry chemical to work immediately—no delay or lag. Finally, *rugged construction* makes it possible for Ansul equipment to give peak performance under the toughest operating conditions.

Call the Ansul Man!

Get in touch with your local Ansul man through the "yellow pages" or write ANSUL CHEMICAL COMPANY, Fire Equipment Division, Dept. F-133, Marinette, Wisconsin. *Write Ansul for your copy of new Fire Equipment Catalog.*

ANSUL

Multiple Dial Indicators Check Jet Engine Blades

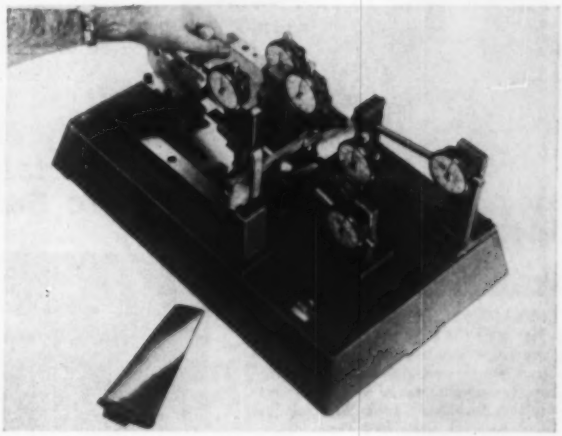
The dependable accuracy and versatility of dial indicators are put to good use in jet engine inspection.

In checking compressor blades, thickness is measured at six different points simultaneously by a series of multiple-dimension dial indicator gages.

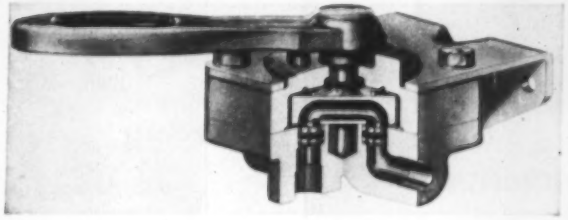
At inspection, a blade is placed in the gage where it rests on three points and is located from its trailing edge and root. A spring-loaded plunger holds the blade in position.

A hand lever moves the gaging contact into position, and the dial indicators show any deviation in thickness at six separate locations.

In this application, dial indicators are ideal. They provide ample accuracy with high magnification. Dimensional variations are clearly indicated. *Write*: Federal Products Corp., 1144 Eddy St., Providence 1, R. I. *Phone*: Stuart 1-9300



Four-Way Air Valve Controls Up to 250 Psi



Any port of the valve can be used as the pressure port. The valve body can be rotated in 90-degree intervals for the most convenient piping.

A sturdy mounting bracket furnished with the valve also can be turned where you want it.

The valves come in $\frac{1}{4}$ and $\frac{3}{8}$-in. sizes. *Write*: Barksdale Valves, 5125 Alcoa Ave., Los Angeles 58, Calif. *Phone*: Ludlow 7-6181

New Spot Welder Is Portable

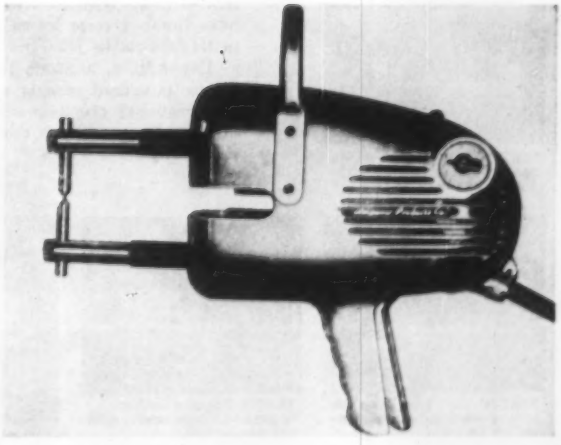
Here is a spot welder for light production runs; it also has many uses in maintenance.

A combined thickness of 3/16-in. of cold rolled steel can be welded.

Model 55 is ruggedly built. It has an electronic timing control which operates a solenoid contactor mounted on the end of the power cable. A Hubbell twist-lock male plug completes the assembly.

The welder is easy to operate. Because of the built-in electronic timing control, all the operator needs to do is set the dial and squeeze the handle. The machine does the work.

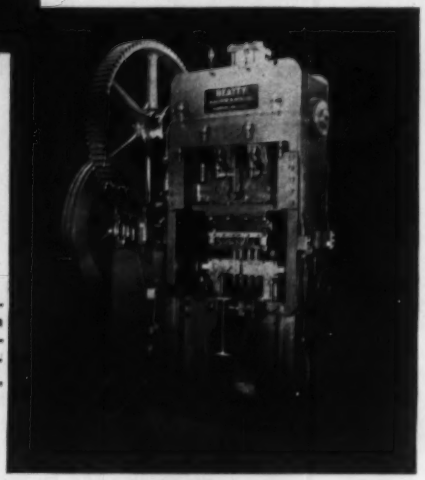
A larger welder is made for production work. It has built-in electronic timing control and solenoid contactor. Transformer arms and tips are water cooled. *Write*: Ampower Products Co., P.O. Box 464, Oak Lawn, Ill. *Phone*: Garden 2-0305



FASTER

WEB and FLANGE PUNCHING

Beatty Built-in Adjustable Tools Save Set-up Time



GUILLOTINE BEAM WEB PUNCH
Six individually controlled punching units with automatically synchronized punch and die, facilitate setting up to various gauge lines. 33" max. setting to outside units; 2⅜" min. setting between units. 200 ton cap.

GUILLOTINE BEAM FLANGE PUNCH
A turn of a handwheel changes punching centers and synchronizes punch with die. Four punching units, with 2¼" - 6¾" setting between inside and outside punches, adjustable 2¼" - 3½". 200 ton cap.

BEATTY Spacing Table handles web and flange punching without roll adjustment.

BEATTY Guillotine Beam Punch. Punches webs and flanges in "I" beams from 6 to 30 inches.

REDUCE COSTS ON "SHORT-ORDER" PUNCHING

Take the high costs out of "short order" punching with these versatile BEATTY Guillotine Beam Punches. They're especially designed to reduce costs in handling short run web and flange punching where punching arrangements are frequently changed.

Incorporating entirely new time-saving *adjustable* tools that eliminate expensive setting up time, reduce down time . . . these BEATTY machines have lowered costs by as much as 75% on some metal fabricating jobs.

Dependable, accurate fast . . . BEATTY machines (standard models or custom-built to your specifications) can help solve your metal fabricating problems — reduce costs. Talk it over with a Beatty engineer!

BEATTY Gap Type Press for forming, bending, flanging, pressing. 250 ton cap.

BEATTY Guillotine Bar Shear for angles, bars, rounds squares without changing tools.

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HAMMOND, IND.

NEW PRODUCTS and equipment

Impact Wrench Calibrator

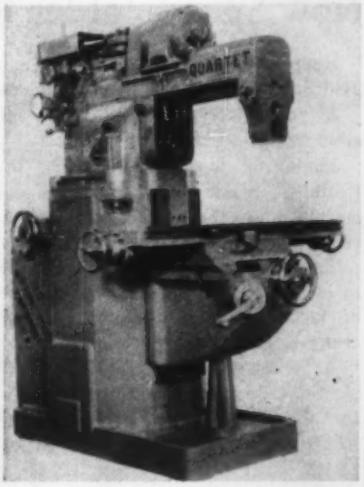
Steel erectors use this tool in tightening high-strength bolts. It calibrates wrenches for bolts ¾, ⅞ and 1-in. in diameter and 2½-in. or more long.

The gage shows direct bolt tension and the recommended values for each size.

The hydraulic calibrator weighs 50 lb. It is self-contained and conforms to recommended procedure. *Write*: Skidmore - Wilhelm Mfg. Co., 442 Green Rd., Cleveland, O. *Phone*: Ivanhoe 1-4774

Milling Machine

The horizontal spindle indexes for universal operations. It is mounted in a massive turret which

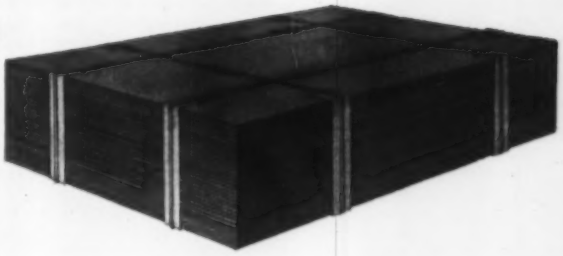


You'll find safety and savings in steel roof deck construction

Steel Roof decking has proved itself an outstanding material for industrial and commercial buildings. Strong, yet light in weight, steel roof decks are easy to apply and economical to maintain. They can be insulated to exact requirements . . . holding roof dead load to a minimum and permitting economy in the design of supporting structures.

The heavy demand for J&L sheet steel to be used in the manufacture of steel roof decks points up the growing acceptance for this method of construction. In addition, it provides evidence of the manufacturer's confidence in J&L's ability to furnish quality steel exactly to specification.

Whatever *your* product, whatever *your* requirements for formability, uniformity or drawing qualities, you can depend on J&L. You get the most out of your production equipment and add to the value of your finished products by using J&L sheet steel.



serving steel users everywhere—

J&L's nation-wide distribution is supported by its location and facilities for prompt, dependable river, rail and truck shipments.

J&L STEEL

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STEEL CORPORATION — *Pittsburgh*

swivels 360 degrees.

When the machine is used as a universal horizontal miller, the spindle is indexed to the required angle, rather than swiveling the saddle. The table retains its inherent stability, and the turret locks at the desired angle.

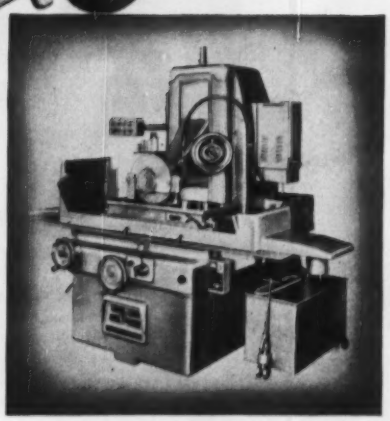
The machine has 30 in. of horizontal travel, 11 in. of cross travel and 16¼-in. of vertical travel.

Horizontal spindle speeds are infinitely variable from 29 to 1450 rpm. Both the horizontal and vertical spindles can be used simultaneously. The machine can be operated while the turret is being indexed.

It is easy to change from one type milling to another; both vertical and angular milling operations can be done. *Write*: U. S. Burke Machine Tool Division, Cincinnati Mfg. Corp., Brotherton Rd., Cincinnati, O. *Phone*: Bramble 5000

FOUND WHERE WORLD FAMOUS TRACTORS ARE "BORN"

GRAND RAPIDS GRINDERS



The makers of these famous tractors and allied heavy-duty equipment use Grand Rapids Grinders in their toolrooms. In fact, you'll find Grand Rapids Grinders wherever manufacturers place a premium on precision . . . because they're designed and built for lifetime precision grinding. Take our Model 560, shown at right. Its column and base are a massive, one-piece casting for permanent, rigid alignment. Wheel head has powered rapid vertical travel; cross feed and longitudinal travel table are hydraulically actuated. Table speed is variable up to 140 fpm, making this the *fastest* grinder of its type and size!
If you're not already enjoying these standout features in your toolroom, a note on your letterhead will bring full details.

Grand Rapids No. 560 Hydraulic Feed Surface Grinder. Table speed up to 140 fpm. Working surface of table is 14" x 36". Vertical movement of wheel head is 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1800 and 2140 rpm.

GALLMEYER & LIVINGSTON

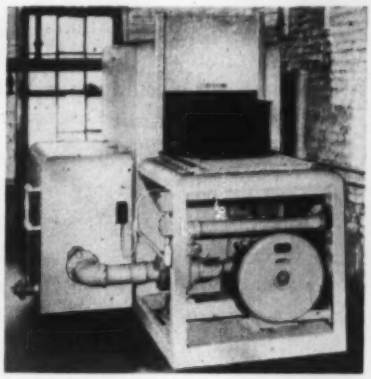
Write for full information.

GALLMEYER & LIVINGSTON CO. 407 STRAIGHT AVE., S.W. GRAND RAPIDS, MICHIGAN

Spray Washing Machine

This packaged washing machine is built in standard sizes to fit carbonitriding furnace trays.

Spray nozzles above and below the work are supplied by a 240 gpm pump which is driven by a 2-hp motor.

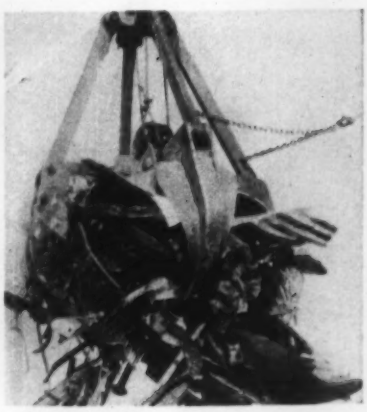


The washer has magnetic starters, automatic temperature control, a pilot safety device and a timer which shuts off the pump at the end of the cycle.

Storage capacity is 500 gallons. Straight-through designs and multistage units with rinse and dry sections available. *Write*: Waukee Engineering Co. Inc., 407 E. Michigan St., Milwaukee 2, Wis. *Phone*: Broadway 2-2317

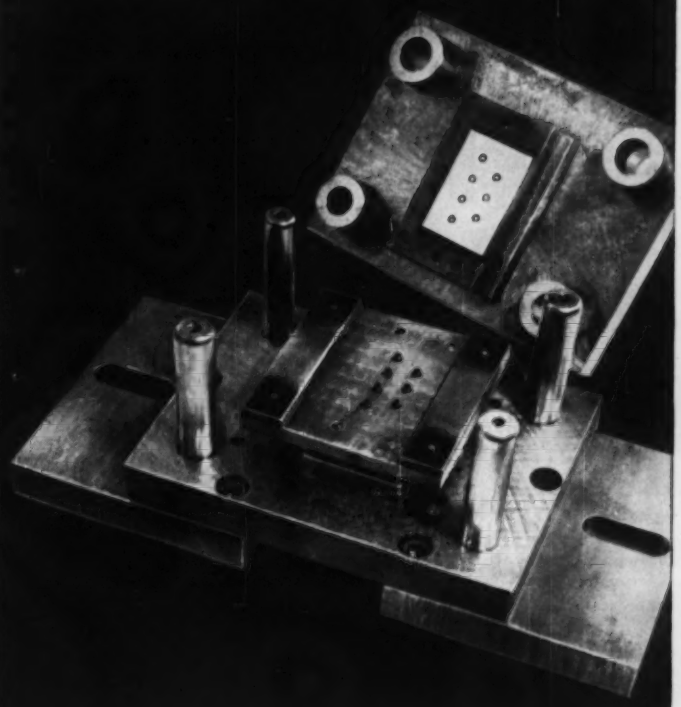
Grappler

Grapples and a magnet are combined to increase pickup capacity two to three times.



Four keenly pointed tines give better penetration into all types of scrap metals. The unit handles

FIELD REPORT: NO. 87



WHICH DIE STEEL WOULD YOU USE HERE to boost production per grind 500%?

These tools blank out dead soft brass washers, .170″ O.D. x .100″ I.D., .009″ thick, on a punch press at 186 strokes per minute. It is an exacting job for a couple of reasons. First, it involves a government contract and strict delivery schedules have to be maintained. Then too, the punch and die are set up to blank seven washers per stroke and have to do this for many millions of pieces . . . and still remain within burr limitations set up by the government. Performance from the steel used in the past was far from satisfactory . . . to maintain schedules, production had to be substantially increased.

Suppose the decision were up to you. Which die steel would you be willing to recommend for steady, trouble-free production?

In this Field Report from customer files, here's what happened: The Carpenter Matched Set Diagram was consulted and Carpenter No. 610 (Air-Wear) was selected. Since then No. 610 has enabled the Company to hold delivery schedules comfortably . . . racking up increases in production per grind as high as 500%. And this is especially significant when you realize that five hours' downtime is involved each time the tools have to be reground. Total parts to date: 5,500,000 . . . and the tool is still good for about 15 regrinds of .003″ each.

Why make the tough decisions alone, when Carpenter's service organization is sincerely interested and equipped to work with you? A move in the right direction would be to call your nearest Carpenter Mill-Branch Warehouse, Office, or Distributor, now. *The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.*

Your toolroom can use Carpenter Matched Tool and Die Steels to:

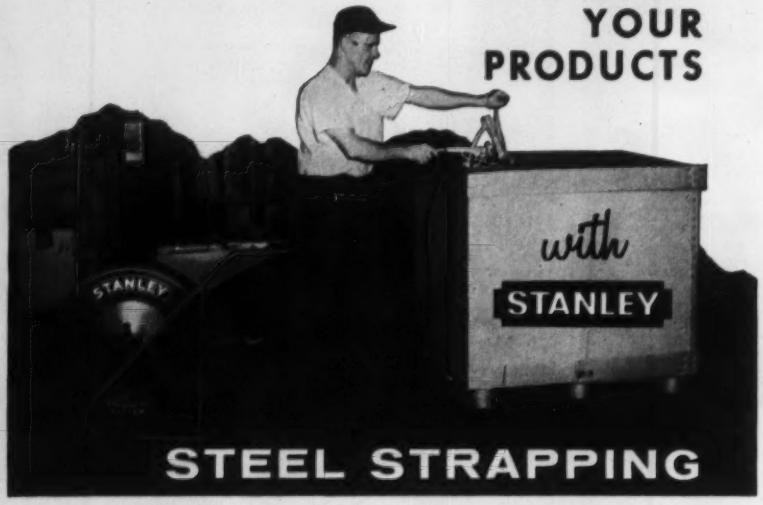
Reduce hardening hazards
Minimize machine downtime
Boost output per grind
Improve product quality

Carpenter STEEL

Matched Tool and Die Steels

IMMEDIATE DELIVERY from local warehouse stocks—Export Address: Port Washington, N. Y.—"CARSTEELCO"

Replace MANY Packages with ONE

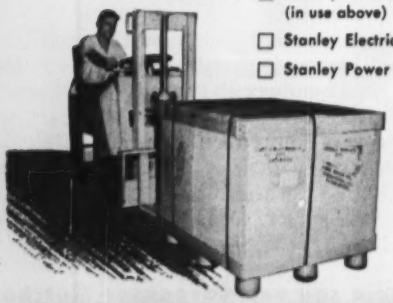


The Stant Manufacturing Company of Connorsville, Indiana is another progressive manufacturer added to a large and growing list of companies palletizing their products for safe, economical shipment with Stanley Steel Strapping.

FORMERLY: Stant shipped its taillight assemblies in numerous small corrugated cartons sealed with gummed tape, each carton requiring interior packing.

NOW: Stant uses the Stanley Steel Strapping System. *75* assemblies now are packed into *one* partitioned carton and strapped to an expendable pallet. This palletized unit is easily, safely handled in storage or en route to customer *because* it is *reinforced* and *protected* by the "sealed strength" of Stanley Steel Strapping. And the *Plus* cost-saving benefits are: less interior packing, fewer cartons, less handling and manpower required.

Stanley has a complete line of steel strapping hand and power tools for easier, faster, safer packing and shipping of boxes, cartons, crates, coils, bundles, skid-loads and pallet-loads.



☐ Stanley ACE Strapping Tool with Automatic Seal Feed (in use above)

☐ Stanley Electric Skid Magazine Tool

☐ Stanley Power Strapping Tool (Models SPS-1, SPS-2)

☐ Stanley Electric Car Banding Tool (Built-in Shear Optional)

Call in the Stanley Steel Strapping Specialist. He'll show you how to pack, move and ship more goods in less time at lower cost. Mail coupon for free catalog.

STANLEY INSURE IT – SECURE IT WITH STANLEY STEEL STRAPPING

STEEL STRAPPING DIVISION

THE STANLEY WORKS

STANLEY STEEL STRAPPING DIVISION, 105D-S LAKE ST., NEW BRITAIN, CONN.
Telephone: BAldwin 9-2021

☐ *Please send Catalog SS-9C.* ☐ *Please have Representative call.*

NAME_____

POSITION_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

STANLEY TOOLS • STANLEY HARDWARE • STANLEY ELECTRIC TOOLS
STANLEY STEEL STRAPPING • STANLEY STEEL

NEW PRODUCTS and equipment

bailing material, small, loose material or prepared scrap.

The grapple-magnet fits in an 8-ft truck body. The grapples weigh about 2300 lb; the magnet 1100 lb. *Write*: M. P. McCaffrey Inc., 2131 E. 25th St., Los Angeles, Calif. *Phone*: Ludlow 8-7181

Tow Truck

This electric, three-wheel tow truck has dual controls. The operator can stop and start it while riding or walking along either side.

The unit is ideal for "picking" in warehouses. The controls are self-canceling when the operator removes his hand.

The truck operates on automotive-type batteries, which can be recharged by plugging into any 110-volt wall socket. *Write*: Tow-Bear Division, Hudson House Inc., 401 S. E. Water St., Portland, Oreg. *Phone*: Belmont 2-5161

Packaging Paper

This new paper combines volatile corrosion inhibitor chemicals with heat sealing properties.

With it, many metalworking and packaging industries now hand wrapping parts, can convert to an automatic or semiautomatic operation. *Write*: Daubert Chemical Co., Chicago, Ill. *Phone*: Andover 3-4342

Gear Checker

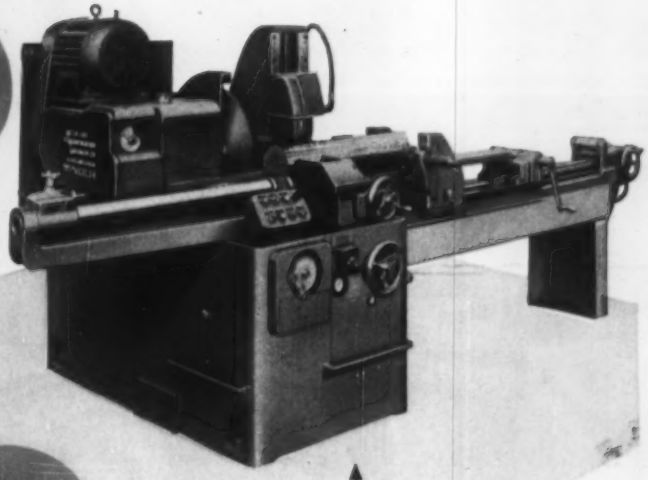
Spur or helical internal gears with pitch diameters from 2 to 18 in. are inspected by this machine.

It checks tooth-to-tooth spacing, pitch or root diameter eccentricity and size, as well as the parallelism of spur gears.

The cast iron base supports a precision, ball-bearing, vertical-

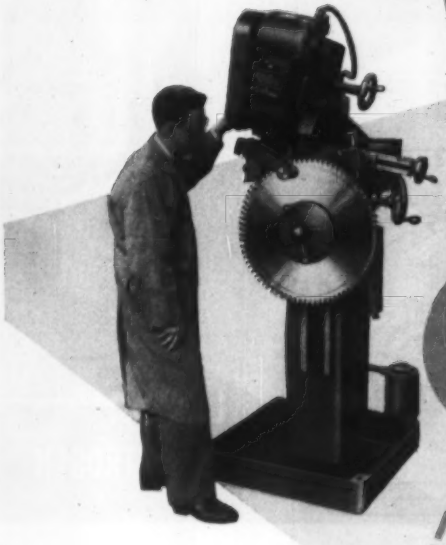
THE Triple-Chip METHOD IS A *Triple-threat* TO HIGH CUTTING COSTS

CIRCULAR SAWING MACHINES



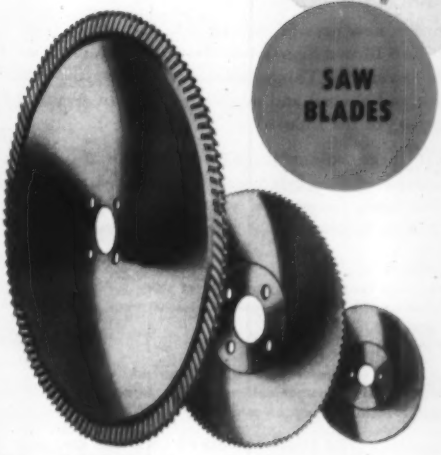
The No. 2-8 machine for cutting off solid metal up to 8" square.

SAW BLADE SHARPENERS



The G-45 sharpener for blades 8" through 48" diameter.

SAW BLADES



M. & M. saw blades cut any machinable metal. Cut-off blades: segmental — 11" through 120" diameter; solid — 8" through 20" diameter. Slitting saws — 3" through 8" diameter.

You may profit immensely by applying the M. & M. Triple Threat to *your* cut-off costs. Machine, blade, and grinder, made by the first company to build all 3, often effect phenomenal savings, as proved by detailed case studies. *Just such a study of your job is yours for the asking.* We offer you an unmatched experience in the sawing of any machinable metal, round, square or structural shapes, from 1/4" through 43" diameter.

THE MOTCH & MERRYWEATHER MACHINERY CO.

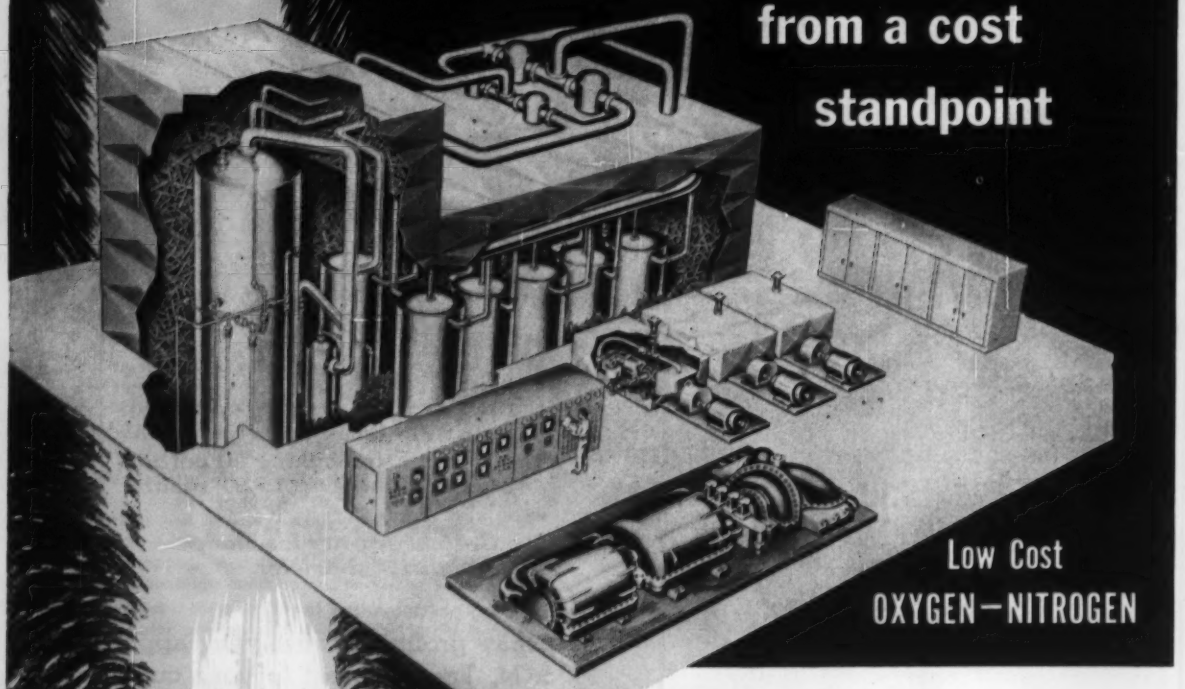
MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

Builders also of Production Milling, Vertical Turning, Automatic and Special Machines

"ON-LOCATION" GENERATORS

make oxygen steel-making practical from a cost standpoint



One of the important new uses of oxygen in steel-making is its application in Top Blown Converters for the production of high quality steel at lower cost. This process is now being successfully employed here and abroad and holds a prominent position in the expansion plans of the industry.

For this and other large volume uses of oxygen in the steel industry, we are prepared to design and build "On-Location" Oxygen and/or Nitrogen Generators to fulfill your particular requirements on a lease basis—*without capital investment.*

We design and build:

Large Capacity Tonnage Generators, regardless of size, purity, high or low pressure cycle, with liquid oxygen pumps, if your oxygen should be under pressure

or

"Packaged" High Purity Generators, producing high purity oxygen and nitrogen simultaneously—oxygen delivered safely under pressure by Air Products patented liquid oxygen pumps.

Send us details regarding your requirements and we will give you actual figures on the savings you can expect with an "On-Location" Generator installed at your plant.

Air Products
INCORPORATED
Dept. N, Box 538, Allentown, Pa.

work spindle. The head that checks tooth spacing, size and eccentricity is mounted on an adjustable overarm.

The parallelism checking head is mounted on vertical ball slides in a casting on the top of the base checker.

The gear checker uses a 30 x 40-in. space. *Write*: National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. *Phone*: Walnut 1-8980

Roughness Sorter

Here is equipment that permits the addition of surface roughness inspection to automated production setups.

Parts are sorted according to microinch roughness measured along a diameter or flat surface, including tapers and parts with grooves or shoulders.

Each application is tailored to the user's requirements. *Write*: Micrometrical Mfg. Co., 345 S. Main St., Ann Arbor, Mich. *Phone*: Normandy 2-5626

Tube Piercing

Double-acting tube piercing units for press brakes and punch presses make clean, accurately located holes.

Standard tube capacities are from ½ to 1-in. OD. The maximum punch diameter is 0.312 in.;

TWO machined parts $1.00
TEN Powdermet* PARTS .... $1.00 (10¢ each)

Don't cut parts—*Cut Costs* with YALE Powdered Metal Parts

Yes, powder metallurgy has an important price story—because when you save the extensive and costly operations involved in machining, it shows up in *more parts* and lower production costs!

But at Yale & Towne, there's another story of *equal* importance ...*complete* engineering service, the kind you can trust—from consultation through production and delivery of parts that are *really* right!

Engineering service has given Yale & Towne its position of leadership in powder metallurgy. We are careful to *recommend only applications where Powdermet* parts will perform successfully.* Then, in design and production of these parts, Yale & Towne offers the experience, know-how, modern facilities and creative ingenuity that *assure* best results.

As a part of this complete engineering service, Yale & Towne maintains a continuous special training program for well-qualified engineers. These men become Powdermet* consultants—available to discuss the advantages and limitations of Powdermet* parts *right in your own plant.* They will show you how Powdermet* may cut your production costs and improve your product. And there is *no obligation* for this engineering counsel.

TAKE ADVANTAGE of Yale & Towne's skilled engineering assistance on your powdered metal problems.

Arrange for a visit by a Yale & Towne consultant —today!

YALE & TOWNE
THE YALE & TOWNE MANUFACTURING CO
Powdered Metal Products Division
9335 BELMONT AVE. • FRANKLIN PARK, ILL.

Send Today for Free Informative Booklet on Powdered Metals

The Yale & Towne Manufacturing Company
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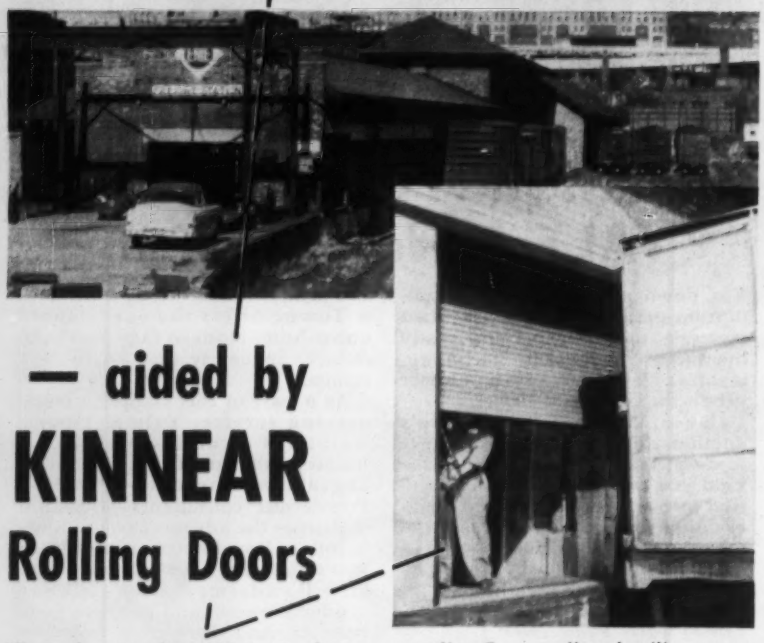
☐ Send Booklet ☐ Send information on Powdermet* parts for attached specifications or drawings.
☐ Have a Yale & Towne Powdermet* engineer call on me.
Name.....Title.....
Company.....
Street Address.....
City.....Zone.....State.....

*Registered Trade Mark

Another sign of freight-handling efficiency —

ERIE



— aided by

KINNEAR

Rolling Doors

Through more than 100 years of service, the Erie Railroad has kept pace with modern needs for quick, safe, low-cost freight-handling.

That's why, for many years, we've been glad to count the Erie among the many famous users of Kinnear Steel Rolling Doors.

Wherever goods, equipment, or rolling stock must be moved in and out of buildings—in any industrial or commercial activity—Kinnear Rolling Doors offer major advantages.

Opening straight upward, they coil *completely out of the way*, safe from damage. Whether opened, closed or in action, they permit full use of all surrounding floor, wall and ceiling space. Their rugged, all metal, heavily galvanized * construction stands up under long, hard use, through toughest weather conditions. Built any size, with manual or electric control, they are easily installed in old or new buildings of any type or construction.

Like the Erie, a majority of America's leading railroads use Kinnear Rolling Doors because they've proved to be a sound investment in long-lasting low-cost, carefree efficiency. *Write for the 1956 Kinnear catalog.*

—with 1.25 ounces of pure zinc per sq. ft. of metal, ASTM standards.

The KINNEAR Mfg. Co.

FACTORIES:
1780-1800 Fields Avenue, Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.

Offices and Agents in Principal Cities

Saving Ways in Doorways
KINNEAR
ROLLING DOORS

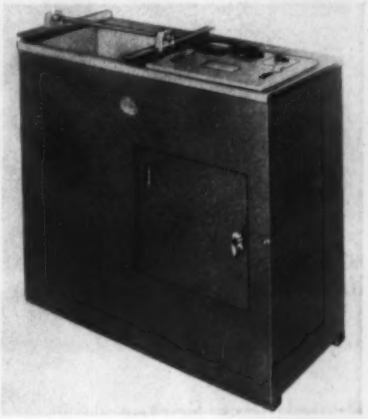
NEW PRODUCTS and equipment

maximum wall thickness of tubing is 0.093-in. Special units for larger holes and tubing are available. *Write*: Wales-Strippit Corp., 345 Payne Ave., North Tonawanda, N. Y. *Phone*: Ludlow 2711

Plating

Here is an automatic plating unit that is portable.

It has a selenium rectifier with automatic timer, stainless steel tank (which may serve as the anode) fitted with a water jacket for temperature control and a centralized control panel. A movable work rack holds a portable plating barrel. A filter and a dripproof pump, with motor, complete the unit.



Smooth, even deposits and high-quality plating are assured by constant motion of the solution around the work. A pump and stainless steel tube at the bottom of the tank do the agitating.

Units come in 10, 20 and 30-gallon capacities. They need only 18 x 38-in. of floor space. *Write*: Bart-Messing Corp., 229 Main St., Belleville 9, N. J. *Phone*: Plymouth 9-0200

Clutch Control

Production and operator safety are increased by a new, electric, two-hand clutch control for industrial machines.

Accidental operation of the clutch is impossible. The clutch can operate only when the control system is functioning properly.

The system prevents an unex-

▲ L-M pond-type chain saws "bucking" log for a veneer plant.

◀ Close-up of MAX-EL alloy steel chain saw bar, showing depth of heat treatment for tougher, longer-lasting bars.

it takes MAX-EL Alloy Steel to take a beating like this

Ram the flying teeth of a chain saw against a heavy log — and watch the sawdust fly! But don't forget — backing up that speeding chain is a bar that has to absorb all the shock . . . yet keep the chain lined up accurately, dependably.

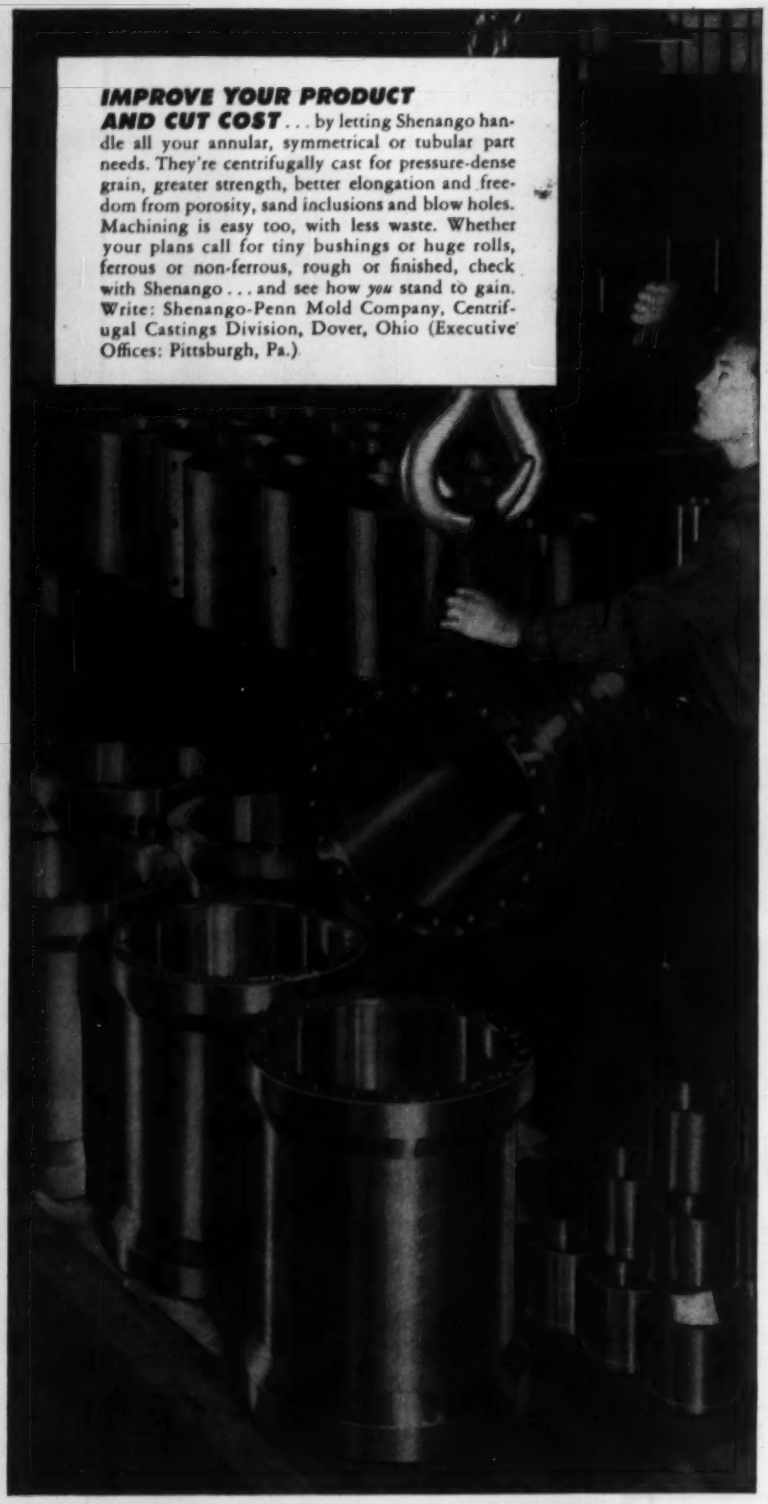
That's a big reason why leading chain saw manufacturers, like L-M Equipment Company, Portland, Oregon, specify Crucible MAX-EL® alloy steel for chain saw bars.

And there are other reasons, too. For MAX-EL is not only tough, wear-resistant and dependable . . . but it also shows outstanding response to heat treatment . . . excellent machinability . . . high uniformity . . . minimum distortion. It's these qualities that permit L-M to machine their saw bars first — *then* give them a graduated heat treatment that insures toughness at the edges . . . flexibility in the main section.

If your product requires a tough, machinable, non-deforming alloy steel — MAX-EL is for you. Try it. To see what information is available on MAX-EL — or *any* Crucible special steel — get your copy of the "Crucible Publication Catalog." Write *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

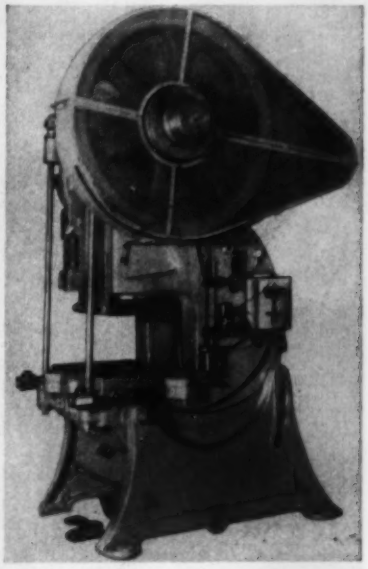


IMPROVE YOUR PRODUCT AND CUT COST . . . by letting Shenango handle all your annular, symmetrical or tubular part needs. They're centrifugally cast for pressure-dense grain, greater strength, better elongation and freedom from porosity, sand inclusions and blow holes. Machining is easy too, with less waste. Whether your plans call for tiny bushings or huge rolls, ferrous or non-ferrous, rough or finished, check with Shenango . . . and see how *you* stand to gain. Write: Shenango-Penn Mold Company, Centrifugal Castings Division, Dover, Ohio (Executive Offices: Pittsburgh, Pa.)

SHENANGO CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES · MONEL METAL
ALUMINUM AND MANGANESE BRONZES · NI-RESIST · MEEHANITE METAL

NEW PRODUCTS and equipment



pected power stroke during setup. It is impossible to cheat on the machine by tying down one control switch. *Write*: Micro Switch Division, Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Thermocouple

A new thermocouple (platinum, 30-per-cent rhodium—platinum, 6-per-cent rhodium calibration) is capable of measuring temperatures up to 1800°C (3272°F).

The thermocouple extends the practical range of temperature measurement without sacrificing sensitivity or corrosion resistance. *Write*: Thermo Electric Co. Inc., Saddle River Township, Rochelle Park P. O., N. J. *Phone*: Hubbard 9-5800

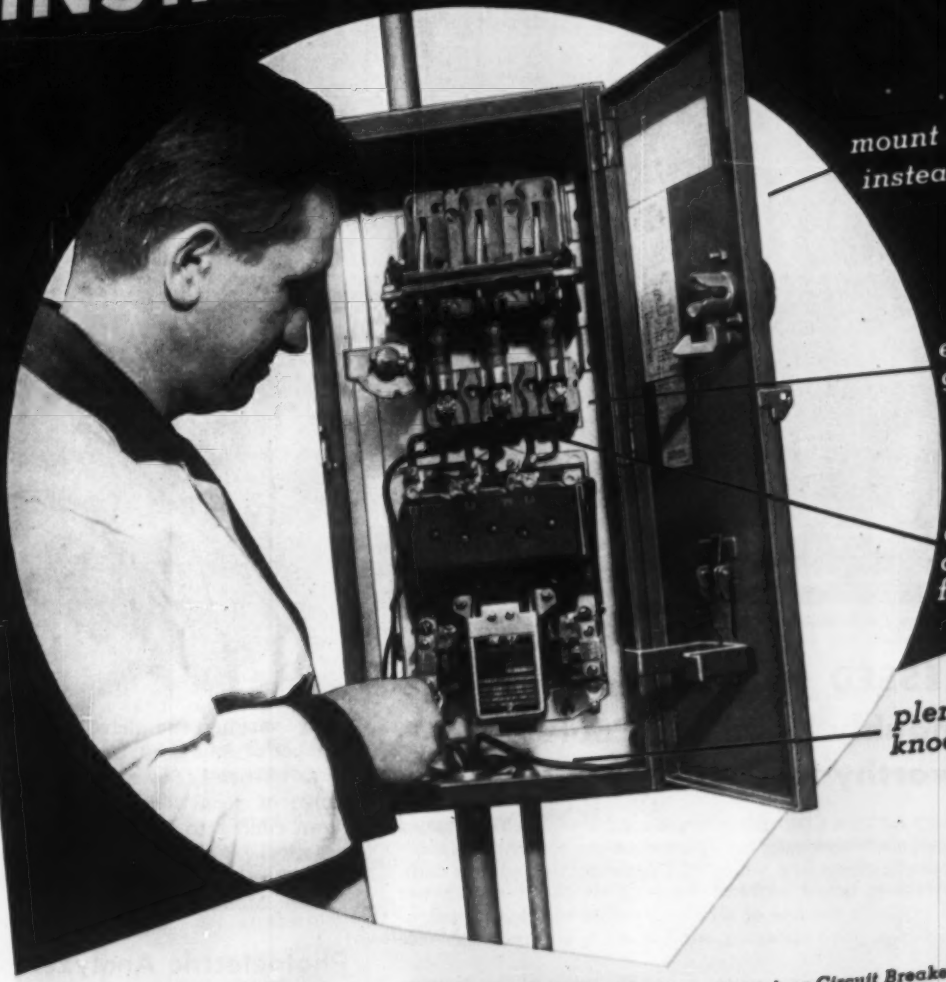
Clutches

Up to 100 per cent more torque capacity is given by Morlife clutch plates. They permit the use of smaller diameter and less expensive clutches.

Less lever or pedal pressure is needed for engaging and disengaging. The clutches are best adapted for heavy machines — tractors, trucks, shovels, bulldozers, tanks, earth movers and graders.

Work life of the clutches has been increased up to 400 per cent. Heat dissipation has been im-

EASIER TO INSTALL AND MAINTAIN!



mount 1 device instead of 2

extra-wide gutters

all components accessible from front

plenty of knockouts

SQUARE D COMBINATION STARTERS

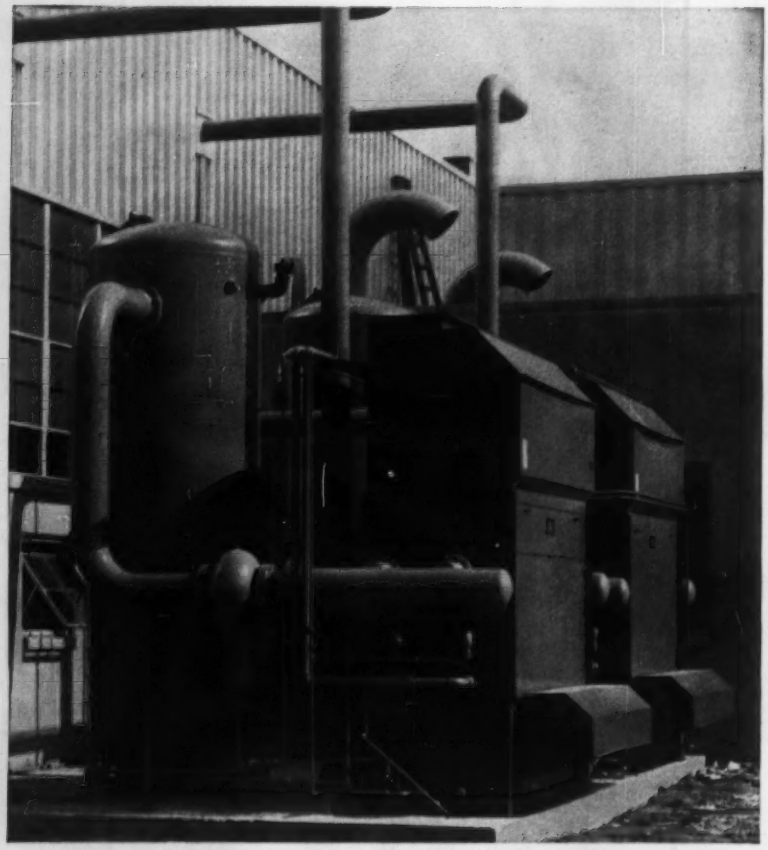
(Switch or Circuit Breaker Types)

Save space and time. Mount and wire one device instead of two . . . neater, more attractive installations.

Write for Bulletins 8538 and 8539
Square D Company, 4041 N. Richards Street, Milwaukee 12, Wisconsin

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY



This Niagara Aero After Cooler also cools compressor jacket and intercooler water.

COMPRESSED AIR... Lower in Cost Dependably Drier and Cooler Trustworthy for Instrument Use

THE NIAGARA *AERO* AFTER COOLER offers a completely self-contained method replacing both shell-and-tube cooler and cooling tower. It is independent of a large supply of cooling water and consistently reduces compressed air temperatures to below ambient. Its drier air gives you a better operation and lower costs in the use of all air-operated automatic instruments, tools and machines, paint spraying, sand blasting and moisture-free air cleaning.

Direct saving in the cost of cooling water saves the price of the Niagara *Aero* After Cooler in less than two years. Water saving also means less expense for piping, pumping, water treatment and water disposal, or you get the use of water elsewhere in your plant where it may be badly needed.

Niagara *Aero* After Cooler assures all these benefits because it cools compressed air or gas below the temperature of the surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air thru a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter, proven in service on the largest plant utility air systems.

Write for complete information; ask for Bulletin No. 130

NIAGARA BLOWER COMPANY

Over 35 Years of Service in Industrial Air Engineering

Dept. S, 405 Lexington Ave. New York 17, N. Y.

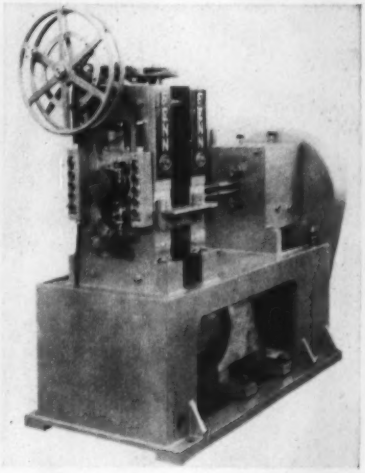
District Engineers in Principal Cities

NEW PRODUCTS and equipment

proved; torque does not fade as heat increases. *Write*: Dept. E, Rockford Clutch Division, Borg-Warner Corp., 1301 18th Ave., Rockford, Ill. *Phone*: 2-0621

Laboratory Rolling Mill

A unique drive on this combination rolling mill permits: Two-high operation; 4-high operation with back-up rolls driven; and 4-high operation with work rolls driven.



By varying the drive and the number of rolls used, the mill operates efficiently over a complete range of reductions—from breakdown rolling to the thinnest gage practical. *Write*: Fenn Mfg. Co., 122 Fenn Rd., Newington, Conn. *Phone*: Mohawk 6-2471

Photoelectric Analyzer

Chemical processes involving liquids, vapors or gases are automatically analyzed, recorded and controlled by the analyzer.

Periodically, the analyzer checks and resets itself to compensate for any smudge accumulation on cell windows or other source of error.

The instrument can record gas or vapor in air down to a few parts per billion. It can be used to give an automatic warning when noxious vapors are in the air, or as a system leak detector. *Write*: Manufacturers Engineering & Equipment Corp., Hatboro, Pa.

One buyer tells another...

"You'll enjoy doing business with Lamson & Sessions"

Did you ever stop to wonder why you patronize a particular store, restaurant or barber shop in preference to all others?

Perhaps it is habit; or maybe convenience. But chances are the main reason is because you *like* the people who serve you. It's a pleasure to do business with them.

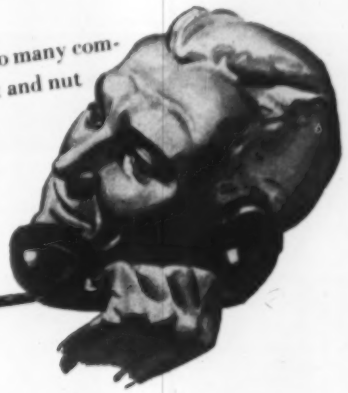
Just out of curiosity we asked several of our customers of long standing the reasons behind their year after year loyalty to Lamson & Sessions.

Of course, we received a variety of answers, but the reason that cropped up most frequently was: "Because we *enjoy* doing business with you."

Naturally that made us feel pretty good. Our people *do* try to give every customer an extra measure of attention over and above the requirements of common courtesy.

All else being equal, perhaps that's why year after year, so many companies prefer to call on Lamson & Sessions for all their bolt and nut requirements.

You, too, can enjoy this kind of business relationship.



Lamson & Sessions

YOU GET MORE WHEN YOU BUY FROM . . .

The LAMSON & SESSIONS Co.

1971 West 85TH St. • Cleveland 2, Ohio

CLEVELAND AND KENT, OHIO • BIRMINGHAM • CHICAGO

NEW literature

Write directly to the company for a copy

Galvanizing and Tinning

Kettles, large and small, for galvanizing and tinning are illustrated —12 pages. Steel Plate Fabricating Division, Columbiana Boiler Co., 200 W. Railroad St., Columbiana, O.

Shell Molding

Machines for preparing shell molding sand and making shells are described. Beardsley & Piper Division, Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Ill.

Diamond Tools

Illustrations show how smaller stones can be used—6 pages. Perattach Diamond Tool Co. Inc., Milford, N. H.

Heat Radiation Detectors

Temperature measurement up to 5000° F and beyond, and the equipment used, are described—catalog EN-S3, 24 pages. Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Radiography

The importance of supervoltage radiography as an inspection and quality control tool is discussed—bulletin R, 25 pages. High Voltage Engineering Corp., 7 University Rd., Cambridge 38, Mass.

Gear Reducer

Here's the description of a universal change gear reducer—6 pages. Philadelphia Gear Works Inc., Erie Ave. & G St., Philadelphia 34, Pa.

Thickeners, Clarifiers, Agitators

Here is information on machines for separating solids from liquids in mining, chemical and metallurgical operations—bulletin 31-E, 16 pages. Hardinge Co. Inc., 240 Arch St., York, Pa.

Clamp Booklet

A line of clamps and handscrews are specified—20 pages. Sales Dept., Wetzler Clamp Co., 43-15 Eleventh St., Long Island City 1, N. Y.

Induction Heating

Here's information on high frequency heating for heat treating, joining and hot forming. Charts give current penetration in steel—6 pages. Magnethermic Corp., 3990 Simon Rd., Youngstown, O.

Press Brakes

Construction details of welded steel press brakes are illustrated—bulletin 2010-H, 8 pages. Cleveland Crane & Engineering Co., 1042 E. 289th St., Wickliffe, O.

Safety Clothing

Here is a description of asbestos safety apparel—12 pages. Johns-Manville, 22 E. 40th St., New York 16, N. Y.

Inspection

Here's how nondestructive testing can save money—8 pages. Magnaflux Corp., 7300 W. Lawrence Ave., Chicago 31, Ill.

Stresses in Steel Bars

The influence of residual stresses in cold-finished steel bars on manufactured parts is described—bulletin 16, 32 pages. La Salle Steel Co., 1412 150th St., Hammond, Ind.

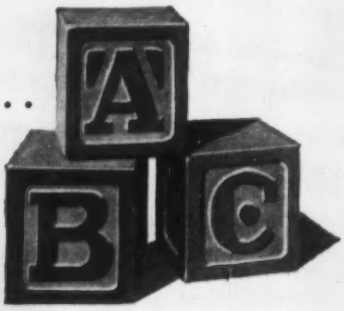
Cranes

Overhead traveling cranes (3-to-15-ton capacity) for economical handling are presented—bulletin 86, 8 pages. Whiting Corp., Harvey, Ill.

Quick-Opening Doors

Ring lock and wedge lock doors for vulcanizers, impregnators, sterilizers and ovens are illustrated—bulle-

as basic as . . .



Designed, developed and constructed for maximum versatility, MAY-FRAN conveyor components now provide users with the ultimate of flexibility. Pre-fabricated conveyor sections can be furnished rapidly and inexpensively. Sections can be assembled to form virtually any type of hinged-steel belt conveyor for handling stampings, formed metal parts, forgings, automotive scrap, chips and turnings and many other miscellaneous products.

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NEW LITERATURE

tin SW-553, 8 pages. Special Equipment Division, Struthers Wells Corp., Titusville, Pa.

Magnetic Conveyors

Space saving conveyors that move ferrous parts up 90-degree inclines are described—bulletin MC-250, 8 pages. Dept. 149, Homer Mfg. Co., Lima, O.

Blast Cleaning

Here's the story of how special airless blast equipment solves production cleaning problems—catalog 724, 34 pages. Wheelabrator Corp., Mishawaka, Ind.

Balancing Machines

Machines for the dynamic balancing of all rotating parts are covered—22 pages. Industrial Division, Bear Mfg. Co., 2016 Fifth Ave., Rock Island, Ill.

Welding Positioners

Specifications for all standard positioning and manipulating equipment are listed—catalog 8155, 28 pages. Pandjiris Weldment Co., 5151 Northrup Ave., St. Louis 10, Mo.

Power Distribution

Here is a planning guide for institutions and office buildings—bulletin GEA-6344, 20 pages. Section 680-1, General Electric Co., Schenectady 5, N. Y.

Surface Active Agents

Agents active in mild acid and alkaline solutions for cleaning and wetting uses are covered—8 pages. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Ball Bearings

Here is the latest information on bearing screws and splines — 32 pages. Saginaw Steering Gear Division, General Motors Corp., Saginaw, Mich.

Carbide Tools

Helpful technical information on carbide drills and cutting tools is given—64 pages. Dept. CNR, Union Twist Drill Co., Athol, Mass.

Double-Disc Grinder

A precision grinder for generating parallel and flat surfaces on small parts is described—bulletin 2V-55, 8 pages. Gardner Machine Co., Beloit, Wis.

Power Sawing Handbook

Summary of cutoff methods includes information on costs—108 pages. DoAll Co., Des Plaines, Ill.

Inclinable Presses

Double crank presses up to 161 tons are described—catalog 3, 12 pages. E. W. Bliss Co., 1375 Raff Rd. S.W., Canton, O.

Metallizing

Sprayed metal coatings and their uses are covered — bulletin 120, 6 pages. Metallizing Engineering Co. Inc., 1011 Prospect Ave., Westbury, Long Island, N. Y.

Corrosion Control

Case histories tell how to stop galvanic corrosion of metals in contact with earth or water—bulletin 4078-HC, 12 pages. Harco Corp., 16981 Broadway, Cleveland, O.

Induction Heating

Heat treating of shafts, axles, pinions, gears, etc., by a general-purpose equipment for scanning or single-shot heating is described—bulletin 85-843. Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 30, Pa.

sections . . . take-up and powered end sections can be furnished to meet specific needs as pertain to conveyor belt width, physical limitations as well as required volume and load capacities.

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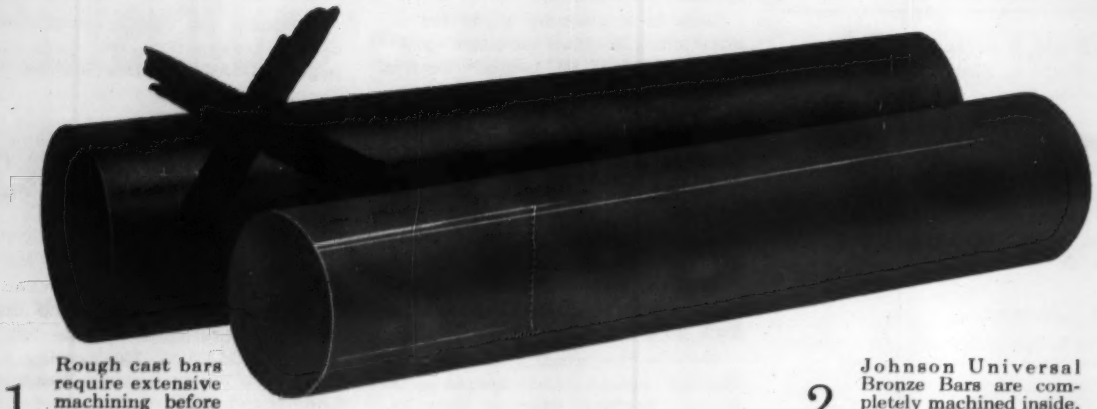

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The size of each bar is plainly stamped on *both ends* for your convenience. This eliminates needless handling and measuring to find the size you want.

Centering holes (see illustration) are punched on ends of each Johnson bar to save costly set-up time.

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Ask your distributor or write for catalog to Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.

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over 900 sizes

UNIVERSAL BRONZE BARS
over 400 sizes

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over 400 sizes

ELECTRIC MOTOR
over 350 sizes

STEEL
December 12, 1955

Market Outlook

STEEL PRODUCTION will break the record this week.

By next Sunday (Dec. 18), more steel for ingots and castings will have been produced in the U. S. this year than in any other full year. Output by the end of this week will be 112.6 million net tons, compared with the 1953 record of 111.6 million.

117-MILLION-TON YEAR—At the rate production is continuing, output for 1955 will total 117 million net tons. Fourth-quarter output is shaping up toward 31.2 million tons, highest rate of the year. A full year at that pace would yield 124.8 million tons.

Output in the week ended Dec. 11 was at 99 per cent of capacity. The preceding week's rate was 100.

SCRAP SETS RECORD—Records are being set, too, by prices of scrap, a steelmaking material. An all-time high of $48.83 a gross ton was reached by STEEL's price composite on steelmaking scrap in the week ended Dec. 7. A month ago, the composite was $45.33.

The upward thrust in scrap prices stems from capacity production of steel in the U. S., strong export demand and winter's handicaps on collection and shipment of scrap.

BACK TO WORK—Need for metallics (scrap and pig iron) is reflected by the return to production of one of the oldest blast furnaces in the U. S. (Sharon Steel Corp.'s Mary furnace at Lowellville, O.) to supply pig iron.

In contrast to the recordbreaking pace of steel production, this season's shipments of Lake Superior iron ore (a raw material for the iron and steel industry) fell below the record. Shipments totaled 87.5 million gross tons. In 1953, the previous record year of steel production, Lake Superior ore shipments totaled 95.8 million gross tons. The difference is more than being made up by imports, which this year will total around 21.5 million tons.

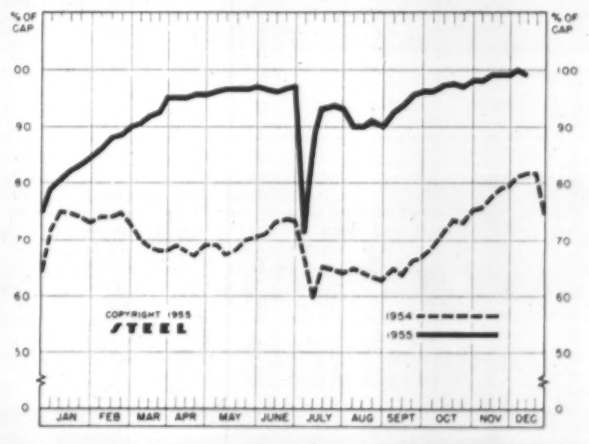
STEEL PRICES RISE—Not only do scrap prices continue their upward trend, but so do steel prices. Price extras on hot-rolled and cold-rolled carbon sheets were revised, most of the changes being upward $1 to $4 a ton. Warehouses are beginning to alter their prices to reflect scattered price changes (mostly upward) by mills. Fabricators of structural steel are raising their quotes to protect themselves against possible higher prices of plain material. Fabricated structural steel prices are $25 to $30 a ton higher than they were at midyear. A producer of electric-furnace silvery pig iron raised its price $5.50 a gross ton, the new price being $91.

RAW MATERIALS UP—Adding upward pressure to steel prices are raw material costs. Manganese ore went up and so did chrome ore from South Africa's Transvaal.

Steel price changes in the latest week do not affect STEEL's price composite on finished steel; it remains at $128.14 a net ton.

BUYING CONFIDENTLY—Demand for steel is unabated. Everyone is confident of a strong first half for 1956 and is ordering steel accordingly. The high rate of activity is prompting railroads to order rails for laying next summer. The New York Central ordered 38,800 tons. It will use 40,000 tons in 1956.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Dec. 11	Change	Same Week 1954	Same Week 1953
Pittsburgh	102.5	+ 3.5*	78	89
Chicago	99	+ 1.5*	90.5	98
Mid-Atlantic	99	0	74	87
Youngstown	100	0	86	88
Wheeling	100	— 2	96	83
Cleveland	98.5	+ 2.5	96	86
Buffalo	105	+ 25	100	100
Birmingham	94.5	+ 0.5	65.5	96.5
New England	89	+ 1	67	80
Cincinnati	91.5	— 1	68	71
St. Louis	103.5	+ 2	80	83.5
Detroit	99	— 1.5	74	97.5
Western	103	0	83	90
National Rate	99	— 1	81.5	85

INGOT PRODUCTION‡

	Week Ended Dec. 11	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	148.4†	146.7	149.7	121.9
NET TONS (In thousands)	2,384†	2,356	2,404	1,958

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 49 Technical Outlook—p. 95

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Dec. 6 1955	Nov. 29 1955	Month Ago	Nov. Average
(1947-1949=100)	154.6	154.6	154.5	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Dec. 6

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.192
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	8.043
Tie Plates	5.625	Strip, C.R., Stainless, 403 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.406
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.366
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	158.925
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical, Stainless, 304 (100 ft)	178.897
Bars, H. R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.935
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	8.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless 430 (lb)	0.578
Bars, C.F., Stainless, 302 (lb)	0.468	Bale ties (bundle)	6.473
Sheets, H.R., Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.229	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 7 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	208.90	208.90	208.90	194.53	167.67
Index in cents per lb	5.659	5.659	5.659	5.270	4.545

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.14	$128.14	$128.14	$117.95	$103.50
No. 2 Fdry, Pig Iron, GT	58.99	58.99	58.99	56.54	52.54
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	52.04
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	53.27
Steelmaking Scrap, GT	48.83	47.00	45.33	32.58	45.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 7 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.70
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	4.18
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.18
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.25	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.65
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.90
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.70
Plates, Chicago	4.50	4.50	4.50	4.225	3.70
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.70
Plates, Claymont, Del.	4.80	4.80	4.80	4.225	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.65-5.25
Strip, C.R., Chicago	6.35	6.35	6.35	5.85	4.50-4.90
Strip, C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.60
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05	$7.50
SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$66.00
Wire rods, 7/32-9/32" Pitts.	5.025	5.025	5.025	4.675	4.10-4.30
PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$53.00
Basic, Valley	58.50	58.50	58.50	56.00	52.00
Basic, deld. Phila.	62.16	62.16	62.16	59.66	56.39
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, deld. Phila.	62.66	62.66	62.66	55.16	56.80
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	55.58
Malleable, Valley	59.00	59.00	59.00	56.50	52.50
Malleable, Chicago	59.00	59.00	59.00	56.50	52.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$47.50	$46.50	$44.50	$32.50	$46.50
No. 1 Heavy Melt, E. Pa.	50.00	48.00	47.00	32.25	45.00
No. 1 Heavy Melt, Chicago	49.00	46.50	44.50	33.00	45.00
No. 1 Heavy Melt, Valley	52.50	52.50	48.00	34.50	46.25
No. 1 Heavy Melt, Cleve.	49.50	49.50	45.50	32.50	45.75
No. 1 Heavy Melt, Buffalo	43.50	43.50	43.50	30.50	41.50
Rails, Rerolling, Chicago	73.50	69.50	65.50	52.50	65.50
No. 1 Cast, Chicago	49.50	49.50	47.50	39.50	62.00
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$13.625	$13.625	$13.625	$13.75	$14.25
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	16.50
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50	21.00

Daily Nonferrous Price Record

	Price Dec. 7	Last Change	Previous Price	Nov. Avg.	Oct. Avg.	Dec. 1954 Avg.
Copper	43.00-48.00	Nov. 30, 1955	43.00-47.00	44.420	44.594	30.000
Lead	15.30	Sept. 26, 1955	14.80	15.300	15.300	14.800
Zinc	13.00	Oct. 21, 1955	13.00-13.50	13.000	13.020	11.500
Tin	105.375	Dec. 7, 1955	104.25	97.825	96.230	88.649
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum	24.40	Aug. 8, 1955	23.20-24.40	24.400	24.400	22.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESSIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

USS Gerrard ties ANYTHING you've ever seen

A fork lift truck drives right into the kiln, picks up the pallet and takes it to the railroad car or to the warehouse. No manual handling is necessary.

The 50-pound tuyeres are palletized right in the kiln. They are stacked 42 to a pallet, and bound with two loops of ¾" x .035" USS Gerrard Flat Steel Strapping.

"USS Gerrard Steel Strapping has saved money in loading, storage, breakage and man-hours not only for us but for our customers as well"

Says Climax Fire Brick Co. • Climax, Pennsylvania

In 1949 the Climax Fire Brick Company turned to USS Gerrard for the best method of handling and shipping odd-size fire bricks, known as tuyeres. Here are the results:

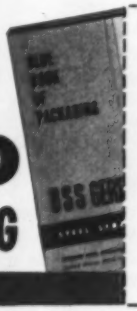
- By using USS Gerrard Flat Steel Strapping they reduced their shipping damage to *less than 1%!*
- Since they can safely stack the Gerrard-palletized tuyeres much higher, they have *increased their storage space by 33%!*
- Loading and moving the tuyeres by hand used to require 8 hours to fill a normal freight car with 2200 units. Using the Gerrard system, it now takes only 2 hours—*a savings of 75% in man-hours alone!*

The tuyeres are used exclusively in the Bessemer Furnace. When fitted together in the furnace, they form a series of continuous holes through which highly compressed air is forced into the molten steel for the purpose of blowing out impurities. Climax Company produces 60% of the nation's tuyere requirements.

It's time for you to try USS Gerrard Steel Strapping — both Round and Flat. Whatever your packaging-tying problem might be, our engineers can help you find the safest, most economical solution. Contact us at your convenience. Meantime, send for your free copy of the new GERRARD Blue Book of Packaging.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL CORPORATION
General Offices: Chicago, Illinois

USS GERRARD STEEL STRAPPING
Round and Flat



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Nonferrous Metals

Aluminum industry receives another vote of confidence. After making thorough market survey, Kaiser announces plans to expand its capacity by 50 per cent

Nonferrous Metal Prices, Pages 150 & 151

ALUMINUM has the spotlight. Reasons: Expansion, a reduction in Canadian production and progress made in consumption.

Kaiser Aluminum & Chemical Corp. receives top billing with its expansion program. Its annual capacity will be upped 50 per cent, to 654,000 tons.

What, Where?—Leading the parade will be a new, 220,000-ton reduction plant (cost: $120 million) at Ravenswood, W. Va. Kaiser already has a $96-million sheet and foil mill under construction at Ravenswood. A $50-million alumina plant (500,000-ton capacity) will be built at Gramercy, La., and some $100 million is being earmarked for increased chemical and mill fabricating facilities.

Two things are apparent: 1. Coal is coming back into its own. 2. Kaiser has beaten St. Joe, Olin-Mathieson and Revere to the Ohio Valley.

Coal will help generate the power supplied by the Ohio Power Co., a subsidiary of American Gas & Electric Co. Philip Sporn, American's president, points out that the coal picture is particularly bright. Reserves are ample and are of high grade. A large portion of the coal is near navigable water routes.

In the Center—Both companies are quick to report that the future of this area is even more important than the present. With this expansion, they explain, will come the development of a great many industries dependent on the raw and semifinished materials produced at the new aluminum center. One Kaiser official states: "Another reason for selecting Ravenswood for the reduction plant is the fact that 70 per cent of the market for aluminum is within a 500-mile radius of this small community."

The power contract provides for the availability of 450,000 kw for 40 years. This means that American Gas & Electric is guaranteeing that as each new facility is built, it will have sufficient capacity ready to meet the power requirements. Ground will be broken in April. Initial production is scheduled for July, 1957. When completed, Kaiser will become the second largest aluminum producer. It is third now.

Kaiser's decision to expand immediately is based on a nine-month market survey it made. It showed: There will be a demand for some 4 million tons of the lightweight metal by 1965. This would about double present consumption.

STEEL's Metal Price Averages for Nov., 1955

(Cents per lb)

Electrolytic Copper, deld. Connecticut	44.420
Lead, St. Louis	15.300
Prime Western Zinc, E. St. Louis, Ill.	13.000
Straits Tin, New York	97.825
Primary Aluminum Ingots, deld.	24.400
Magnesium, Freeport, Tex.	32.500
Nickel, f.o.b. refinery	64.500

Nature's Trick—While Kaiser was announcing its expansion, Aluminium Ltd. was admitting that the corporation's chief subsidiary, Aluminum Co. of Canada, is being forced to curtail its aluminum production during the winter months. Reason: A summer drouth, the worst on record, has reduced the amount of water available for power. Until spring thaws come, Alcan will lose about 5 per cent of its production. The corporation's rated capacity for this year is 650,000 tons. It will miss reaching capacity by about 7 per cent because of the drouth (Quebec area) and an accidental power interruption at Kitimat during the year. All told, some 35,000 tons will be lost during the next few months.

There is one bright spot. Next year will bring in 82,000 tons of new capacity, which should provide at least 35,000 tons of new production during the second half. The exact increase will hinge on how quickly additional capacity can be put into operation during 1956.

Alcoa, Too—Appearing before industrialists at the Second Pitt Conference on business prospects, Don Wilmot, vice president, Aluminum Co. of America, noted that aluminum consumption is out-stripping the pace of U. S. industrial growth. He explains that the domestic consumption of aluminum is well ahead of the Federal Reserve Board's index of industrial growth.

Factors pointing to success: 1. Aluminum ingot's price of 24.4-cents per pound is only 22 per cent above 1939 levels. 2. Aluminum is free from the effects of world political and economic uncertainties. 3. It is enjoying growing acceptance on its own merit.

"We in the aluminum business," says Mr. Wilmot, "are pleased that our metal has become so popular. However, we recognize that our invasion of markets will not always be successful, nor will we retain some of our present markets when competitive materials go all out to win back lost markets."

Copper Strike Collapses

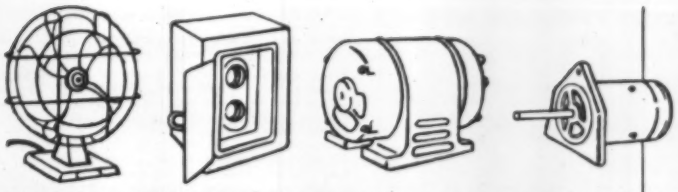
The strike clouds in Chile threatened, then subsided, early last week. But strike or no strike, there is little hope for an improved balance between copper supply and demand until the second quarter of 1956.

Industry leaders feel that the price of the primary red metal will remain constant. The custom smelters' price may remain at about 48 cents a pound. It is almost certain that it will not drop until after the first of the year.

With LIFO going out as of Dec. 31, there are a few experts who think that this might make some extra copper available. Others quickly point out that all companies still will be looking for copper to rebuild depleted inventories. Most companies are getting only enough to meet current production needs.

Silver Prices Rebound

Silver prices, after having a steady year, are reflecting a seasonal trend. The arts users of the precious metal now have their products on the Christmas counters. However, when the price dropped to 90 cents a troy ounce last week, it took all domestic silver off the market as the U. S. mint is paying 90½-cents for the metal. With the price drop, West Coast producers were quick to take advantage of being able to ship to San Francisco or Denver mints rather than to the East Coast. The 90 cent price was short lived. There was still enough civilian demand to send the price back to about 90¾-cents per ounce.



FROM ELECTRIC FURNACE TO ELECTRIC INDUSTRY

Newport Steel

Manufacturers of electrical equipment represent another of the many industries which make Newport Steel their regular source of supply. The confidence of these outstanding manufacturers is based upon Newport's ability to deliver qualities and quantities of steel to precise specification. For Newport has the facilities, personnel, experience and strategic location to meet the most exacting demands for the products listed at the right.

PRODUCTS OF NEWPORT STEEL

Cold-Rolled Sheets
Hot-Rolled Steel in Coil
Hot-Rolled Pickled Steel in Coil
Hot-Rolled Sheets
Hot-Rolled Pickled Sheets
Galvanized Sheets
Galvannealed Sheets
Colorbond Sheets
Electrical Sheets
Alloy Sheets and Plates
Electric Weld Line Pipe
Roofing and Siding
Eave Trough and Conductor Pipe
Culverts

ECONOMICAL WATERAIL-TRUCK DELIVERY

Newport Steel is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads and 143 motor carriers enable Newport to give economical, dependable delivery to the entire area of the Middle West and South.

Newport Steel

CORPORATION

NEWPORT, KENTUCKY

YOUR CONFIDENCE IS JUSTIFIED WHERE THIS FLAG FLIES

A SUBSIDIARY OF MERRITT-CHAPMAN & SCOTT CORPORATION

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50. 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00. Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 48.00 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$120 nom, per troy oz.

Lead: Common, 15.30, chemical, 15.40, corroding, 15.40, St. Louis, New York basis, add 0.20.

Lithium: 99%+, cups, or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis. 100 lb lots.

Magnesium: 99.8% self-palletizing pig, 32.50; notched ingot, 32.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $280-$285 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.35 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.90; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom, per troy oz.

Palladium: $22-24 per troy oz.

Platinum: $97-$117 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 90.50 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 105.375.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45, grade A-2 (0.5% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced $5.00. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade 14.75, deld. Diecasting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 32.00-34.00; No. 12 foundry alloy (No. 2 grade) 31.00-31.25; 5% silicon alloy, 0.60 Cu max, 32.50-33.25; 13 alloy, 0.60 Cu max, 32.50-33.25; 195 alloy, 32.50-33.25; 108 alloy, 31.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 31.00-32.00; grade 2, 30.00-31.00; grade 3, 29.00-30.00; grade 4, 28.00-29.50.

Brass Ingot: Red brass No. 115, 42.00; tin bronze No. 225, 56.00; No. 245, 48.75; high-leaded tin bronze No. 305, 45.75; No. 1 yellow No. 405, 33.25; manganese bronze No. 421, 37.75.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l. 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21 per cwt; pipe, full coils, $21 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H. R. strip, $19; C. R. trip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153
Shot, Blocks	...	71	...

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: ASA. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in.; tread plate, 64.00c, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate 66.00c, 30,000 lb or more, 0.250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangles, ¼ x 2 in., 64.70c; 1 x 4 in., 69.50c. Rod, 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 in. OD x 0.065 in., 82.50c. Angles, 1 x 1 x ⅛-in., 68.40c; 2 x 2 x ¼-in., 62.50c. Channels, 5 in., 63.40c. I-beams, 5 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 19.50-20.00; old sheets 16.50-17.25; borings and turnings, 11.00-11.50; crankcases, 16.50-17.25; industrial castings 16.50-17.25.

Copper and Brass: No. 1 heavy copper and wire 39.00-40.00; No. 2 heavy copper and wire, 36.00-37.00; light copper, 34.00-34.50; No. 1 composition red brass, 30.00-31.00; No. 1 composition turnings, 28.50-29.50; yellow

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	63.13b	60.36c	....	63.32	39.000	39.000	38.250
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	28.625	26.750
Red Brass, 85%	58.09	58.03	58.63	60.90	34.250	34.000	33.500
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.500	32.000
Naval Brass	55.63	49.94	62.69	58.79	26.750	26.500	26.000
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.000
Nickel Silver, 10%	66.00	68.33g	68.33	....	32.500	32.250	16.250
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.000
Silicon Bronze	66.54	65.73	66.58	68.68e	37.875	37.625	37.875
Manganese Bronze	59.37	53.38	63.82	....	27.000	26.750	26.000
Muntz Metal	53.74	49.55	....	....	27.000	26.750	26.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

brass turnings, 16.00-16.50; new brass clippings, 24.50-25.50; light brass, 16.50-17.50; heavy yellow brass, 19.50-20.50; new brass rod ends, 23.50-24.00; auto radiators, unsweated, 23.00-24.00; cocks and faucets, 23.50-24.50; brass pipe, 23.50-25.00.

Lead: Heavy, 12.00-12.50; battery plates, 6.50-6.75; linotype and stereotype, 13.25-14.25; electrotype, 12.00-12.75; mixed babbitt, 14.50

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 54.50-65.00; old sheets, 50.00-65.00; turnings, 44.00; rods, 54.50-65.00.

Nickel: Sheets and clips, 90.00-125.00; rolled anodes, 90.00-125.00; turnings, 75.00-100.00; rod ends, 90.00-125.00.

Zinc: Old zinc, 5.50-6.00; new die-cast scrap, 5.00-5.75; old die-cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 23.50; 3003 clippings, 23.25-23.50; 6151 clippings, 23.00-23.50; 5052 clippings, 23.00-23.50; 2014 clippings, 22.50-23.00; 2017 clippings, 22.50-23.00; 2024 clippings, 22.50-23.00; mixed clippings, 22.50-23.00; old sheet, 19.50-20.50; old cast, 20.50; clean old cable (free of steel), 23.50; borings and turnings, 20.50-21.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 41.00; No. 2 heavy copper and wire, 39.50; light copper, 37.25; refinery brass (60% copper) per dry copper content, 37.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 41.00; No. 2 heavy copper and wire, 39.50; light copper, 37.25; No. 1 composition borings, 33.00-33.75; No. 1 composition solids, 34.00-34.25; heavy yellow brass solids, 23.00; yellow brass turnings, 22.00; radiators, 26.00-26.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 59.79, oval, 58.92, 5000-10,000 lb; electrodeposited, 54.28, 2000-5000 lb lots; cast 59.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.225; 200-499 lb, $1.21; 500-999 lb, $1.205; 1000 lb or more, $1.20.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 200 lb, 75.40; 100-600 lb, 60.90; 700-1900 lb, 58.30; 2000-9900 lb, 56.70; 10,000 lb or more, 55.50.

Stannous Chloride (anhydrous): Less than 50 lb, $1.637; 50 lb, $1.297; 100-300 lb, $1.147; 400-900 lb, $1.122; 1000-1900 lb, $1.098; 2000-4900 lb, $1.061; 5000-19,900 lb, $1.00; 20,000 lb or more, 94.00.

Stannous Sulphate: Less than 50 lb, $1.333; 50 lb, $1.033; 100-1900 lb, $1.013; 2000 lb or more, 99.30.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

AIR LIFT
for heavy materials

Crowded isles and sluggish flow of materials cost you money. So why not go over the top! You can speed production, cut your costs with Conco Cranes, custom designed for your specific needs. Let us show you how. Write for a trained Conco engineer to call and make recommendations, or request bulletin 3000A covering our complete Conco line. Conco Cranes are backed by 37 years of experience.

CONCO ENGINEERING WORKS
Division of H. D. CONKEY & COMPANY
70-14th Avenue, Mendota, Illinois

CRANES HOISTS CONCO

AFFILIATES
CONCO ENGINEERING WORKS—Domestic Heating Equipment
CONCO BUILDING PRODUCTS, INC.—Brick, Tile, Stone

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 153. Key to footnotes, Page 155.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$65.50

INGOTS, Alloy (NT)

Detroit R7 .....$69.00
Houston S5 .....74.00
Midland,Pa. C18 .....69.00
Munhall,Pa. U5 .....69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$68.50
Bessemer,Pa. U5 ....68.50
Bridgeport,Conn. N19..73.50
Buffalo R2 .....68.50
Clairton,Pa. U5 .....68.50
Ensley,Ala. T2 .....68.50
Fairfield,Ala. T2 .....68.50
Fontana,Calif. K1 .....76.00
Gary, Ind. U5 .....68.50
Johnstown,Pa. B2 ....68.50
Lackawanna,N.Y. B2 ..68.50
LoneStar,Tex. L6 ....74.50
Munhall, Pa. U5 .....68.50
Pittburgh J5 .....68.50
S.Chicago,Ill. R2, U5..68.50
S.Duquesne,Pa. U5 ...68.50
Youngstown R2 .....68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$84.50
Bessemer,Pa. U5 .....84.50
Bridgeport,Conn. N19..89.50
Buffalo R2 .....84.50
Canton,O. R2 .....86.50
Clairton,Pa. U5 .....84.50
Conshohocken,Pa. A3..89.50
Ensley,Ala. T2 .....84.50
Fairfield,Ala. T2 .....84.50
Fontana,Calif. K1 .....92.00
Gary,Ind. U5 .....84.50
Geneva,Utah C11 .....84.50
Houston S5 .....89.50
Johnstown,Pa. B2 ....84.50
Lackawanna,N.Y. B2..84.50
Los Angeles B3 .....94.00
Midland,Pa. C18 .....84.50
Munhall,Pa. U5 .....84.50
Pittsburgh J5 .....84.50
Seattle B3 .....98.00
S.Chicago R2,U5,W14..84.50
S.Duquesne,Pa. U5 ....84.50
S.SanFrancisco B3 ....94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$96.00
Buffalo R2 .....96.00
Canton,O. R2, T7 ...96.00
Conshohocken,Pa. A3..103.00
Detroit R7 .....96.00
Fontana,Calif. K1 ....115.00
Gary,Ind. U5 .....96.00
Houston S5 .....101.00
Ind.Harbor,Ind. Y1 ...96.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....116.00
Massillon,O. R2 .....96.00
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
S.Chicago R2,U5,W14..96.00
S.Duquesne,Pa. U5 ....96.00
Struthers,O. Y1 .....96.00
Warren,O. C17 .....96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$103.50
Canton,O. R2 .....103.50
Cleveland R2 .....103.50
Gary,Ind. U5 .....103.50
S.Chicago R2, W14 ...103.50
S.Duquesne,Pa. U5 ...103.50

SKELP

Aliquippa,Pa. J5 .....4.325
LoneStar,Tex. L6 ....4.625
Munhall,Pa. U5 .....4.225
SparrowsPoint,Md. B2..4.225
Warren,O. R2 .....4.225
Youngstown R2, U5 ...4.225

WIRE RODS

AlabamaCity,Ala. R2 ..5.025
Aliquippa,Pa. J5 .....5.025
Alton,Ill. L1 .....5.20
Buffalo B11, W12 ....5.025
Cleveland A7 .....5.025
Donora,Pa. A7 .....5.025
Fairfield,Ala. T2 .....5.025
Houston S5 .....5.275
IndianaHarbor,Ind. Y1..5.025
Johnstown,Pa. B2 ....5.025
Joliet,Ill. A7 .....5.025
KansasCity,Mo. S5 ....5.275
Kokomo,Ind. C16 .....5.125
LosAngeles B3 .....5.825
Minnequa,Colo. C10 ...5.275
Monessen,Pa. P7 .....5.025
N.Tonawanda,N.Y. B11..5.025
Pittsburg,Calif. C11 ...5.675
Portsmouth P12 .....5.025
Roebling,N.J. R5 .....5.125
S.Chicago,Ill. R2 .....5.025
SparrowsPoint,Md. B2..5.125
Sterling,Ill.(1) N15 ....5.025
Sterling,Ill. N15 .....5.125
Struthers,O. Y1 .....5.025
Worcester,Mass. A7 ...5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....4.60
Aliquippa,Pa. J5 .....4.60
Bessemer,Ala. T2 .....4.60
Bethlehem,Pa. B2 .....4.65
Birmingham C15 .....5.10
Clairton,Pa. U5 .....4.60
Fairfield,Ala. T2 .....4.60
Fontana,Calif. K1 .....5.25
Gary,Ind. U5 .....4.60
Geneva,Utah C11 .....4.60
Houston S5 .....4.70
Ind.Harbor,Ind. I-2 ....4.60
Johnstown,Pa. B2 .....4.65
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ....4.65
LosAngeles B3 .....5.30
Minnequa,Colo. C10 ....4.90
Munhall,Pa. U5 .....4.60
Niles,Calif. P1 .....4.90
Portland,Oreg. O4 ....5.35
Phoenixville,Pa. P4 ....5.15
Seattle B3 .....5.35
S.Chicago U5, W14 ....4.60
S.SanFrancisco B3 ....5.25
Torrance,Calif. C11 ....5.30
Weirton,W.Va. W6 ....4.60

Wide Flange

Bethlehem,Pa. B2 .....4.65
Clairton,Pa. U5 .....4.60
Fontana,Calif. K1 .....5.40
Lackawanna,N.Y. B2 ....4.65
Munhall,Pa. U5 .....4.60
Phoenixville,Pa. P4 ....5.15
S.Chicago,Ill. U5 .....4.60

Alloy Std. Shapes

Clairton,Pa. U5 .....5.65
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....5.65
Houston S5 .....5.75
Munhall,Pa. U5 .....5.65
S.Chicago,Ill. U5 .....5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....6.75
Bessemer,Ala. T2 .....6.75
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.75
Fairfield,Ala. T2 .....6.75
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.75
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Ind.Harbor,Ind. I-2, Y1..6.75
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. S5 ....6.85
Lackawanna,N.Y. B2 ...6.80
LosAngeles B3 .....7.45
Munhall,Pa. U5 .....6.75
Seattle B3 .....7.50
S.Chicago,Ill. U5, W14..6.75
S.SanFrancisco B3 ....7.40
Struthers,O. Y1 .....6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ....6.80
Lackawanna,N.Y. B2 ...6.80
Munhall,Pa. U5 .....6.75
S.Chicago,Ill. U5 .....6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .....4.65
Lackawanna,N.Y. B2 ...4.65
Munhall,Pa. U5 .....4.60
S.Chicago,Ill. U5 .....4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ....5.45
Munhall,Pa. U5 .....5.45
S.Chicago,Ill. U5 .....5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.50
Aliquippa,Pa. J5 .....4.50
Ashland,Ky.(15) A10 ...4.50
Bessemer,Ala. T2 .....4.50
Bridgeport,Conn. N19 ..4.75
Buffalo R2 .....4.50
Clairton,Pa. U5 .....4.50
Claymont,Del. C22 ....4.80
Cleveland J5, R2 .....4.60
Coatesville,Pa. L7 ....4.80
Conshohocken,Pa. A3 ..4.50
Detroit M1 .....4.60
Ecorse,Mich. G5 .....4.60
Fairfield,Ala. T2 .....4.50
Fontana,Calif.(30) K1 ..5.15
Gary,Ind. U5 .....4.50
Geneva,Utah C11 .....4.50
GaniteCity,Ill. G4 ....4.70
Harrisburg,Pa. P4 .....5.10
Houston S5 .....4.60
Ind.Harbor,Ind. I-2, Y1..4.50
Johnstown,Pa. B2 .....4.50
Lackawanna,N.Y. B2 ...4.50
LoneStar,Tex. L6 .....4.85
Mansfield,O. E6 .....4.50
Minnequa,Colo. C10 ....5.35
Munhall,Pa. U5 .....4.50
Newport,Ky. N9 .....4.50
Pittsburgh J5 .....4.50
Riverdale,Ill. A1 .....4.725
Seattle B3 .....5.40
Sharon,Pa. S3 .....4.50
S.Chicago R2, U5, W14..4.50
SparrowsPoint,Md. B2 ..4.50
Steubenville,O. W10 ....4.50
Warren,O. R2 .....4.50
Weirton,W.Va. W6 ....4.50
Youngstown R2, U5, Y1..4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....5.65
Fontana,Calif. K1 .....6.30
Geneva,Utah C11 .....5.65
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 ....10.40

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.725
Bessemer,Ala. T2 .....6.725
Clairton,Pa. U5 .....6.725
Cleveland J5, R2 .....6.725
Claymont,Del. C22 ....6.725
Coatesville,Pa. L7 ....6.725
Conshohocken,Pa. A3 ..6.725
Ecorse,Mich. G5 .....6.825
Fairfield,Ala. T2 .....6.725
Fontana,Calif.(30) K1 .7.375
Gary,Ind. U5 .....6.725
Geneva,Utah C11 .....6.725
Houston S5 .....6.825
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 .....6.725
LosAngeles B3 .....7.625
Munhall,Pa. U5 .....6.725
Pittsburgh J5 .....6.725
Seattle B3 .....7.625
Sharon,Pa. S3 .....6.725
S.Chicago,Ill. U5, W14..6.725
SparrowsPoint,Md. B2..6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy

Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 .....6.30
Coatesville,Pa. L7 .....6.30
Fontana,Calif. K1 .....6.95
Gary,Ind. U5 .....6.30
Houston S5 .....6.40
Ind.Harbor,Ind. Y1 .....6.30
Johnstown,Pa. B2 .....6.30
Munhall,Pa. U5 .....6.30
Newport,Ky. N9 .....6.30
Seattle B3 .....7.20
Sharon,Pa. S3 .....6.30
S.Chicago,Ill. U5, W14..6.30
SparrowsPoint,Md. B2 ..6.30
Youngstown Y1 .....6.30

FLOOR PLATES

Cleveland J5 .....5.575
Conshohocken,Pa. A3 ..5.575
Harrisburg,Pa. P4 .....5.575
Ind.Harbor,Ind. I-2 ....5.575
Munhall,Pa. U5 .....5.575
S.Chicago,Ill. U5 .....5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l. R2 .....5.10
Warren,O. c.l. R2 .....5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 .....4.65
Aliquippa,Pa. J5 .....4.65
Alton,Ill. L1 .....4.85
Atlanta A11 .....4.85
Bessemer,Ala. T2 .....4.65
Birmingham C15 .....5.15
Bridgeport,Conn. N19 ..4.80
Buffalo R2 .....4.65
Canton,O. R2 .....4.75
Clairton,Pa. U5 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.65
Houston S5 .....4.90
Ind.Harbor,Ind. I-2, Y1..4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....4.65
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ...4.65
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.75
Midland,Pa. C18 .....4.65
Milton,Pa. M18 .....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.00
N.Tonawanda,N.Y. B11..4.65
Pittsburg,Calif. C11 ...5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
Seattle B3, N14 .....5.40
S.Chicago R2, U5, W14..4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFran.,Calif. B3 ...5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Warren,O. R2 .....4.65
Weirton,W.Va. W6 .....4.65
Youngstown R2, U5 ....4.65

BARS, H.R. Leaded Alloy

Warren,O. C17 .....6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 .....5.575
Bridgeport,Conn. N19 .5.725
Buffalo R2 .....5.575
Canton,O. R2, T7 .....5.575
Clairton,Pa. U5 .....5.575
Detroit R7 .....5.575
Ecorse,Mich. G5 .....5.675
Fontana,Calif. K1 .....6.625
FairlessHills,Pa. U5 ...5.725
Gary,Ind. U5 .....5.575
Houston S5 .....5.825
Ind.Harbor,Ind. I-2,Y1.5.575
Johnstown,Pa. B2 .....5.575
KansasCity,Mo. S5 ....5.825
Lackawanna,N.Y. B2 ..5.575
LosAngeles B3 .....6.625
Massillon,O. R2 .....5.575
Midland,Pa. C18 .....5.575
S.Chicago, R2, U5, W14.5.575
S.Duquesne,Pa. U5 ....5.575
Struthers,O. Y1 .....5.575
Warren,O. C17 .....5.575
Youngstown U5 .....5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.80
Bessemer,Ala. T2 .....6.80
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.80
Cleveland R2 .....6.80
Ecorse,Mich. G5 .....6.90
Fairfield,Ala. T2 .....6.80
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
Ind.Harb.,Ind. I-2, Y1 ...6.80
Johnstown,Pa. B2 .....6.80
KansasCity,Mo. S5 .....7.05
Lackawanna,N.Y. B2 ...6.80
LosAngeles B3 .....7.50
Pittsburgh J5 .....6.80
Seattle B3 .....7.55
S.Chicago W14 .....6.80
S.Duquesne,Pa. U5 ....6.80
S.SanFrancisco B3 ....7.55
Struthers,O. Y1 .....6.80
Warren,O. R2 .....6.80
Youngstown U5 .....6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 .....4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....4.65
Atlanta A11 .....4.85
Fontana,Calif. K1 .....5.35
Niles,Calif. P1 .....5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
SanFrancisco S7 .....5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....5.65
Gary,Ind. U5 .....5.65
Houston S5 .....5.90
KansasCity,Mo. S5 ....5.90
Youngstown U5 .....5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ....8.325
Camden,N.J. P13 .....8.50
Chicago W18 .....8.325
Cleveland C20 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
SpringCity,Pa. K3 ....8.50
Warren,O. C17 .....8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....5.90
BeaverFalls,Pa. M12, R2 5.90
Buffalo B5 .....5.95
Camden,N.J. P13 .....6.35
Carnegie,Pa. C12 .....5.90
Chicago W18 .....5.90
Cleveland A7, C20 ....5.90
Detroit R7 .....5.90
Detroit B5, P17 .....6.10
Donora,Pa. A7 .....5.90
Elyria,O. W18 .....5.90
FranklinPark,Ill. N5 ....5.90
Gary,Ind. R2 .....5.90
GreenBay,Wis. F7 .....5.90
Hammond,Ind. L2, M13.5.90
Hartford,Conn. R2 ....6.40
Harvey,Ill. B5 .....5.90
LosAngeles R2, S30 ....7.35
Mansfield,Mass. B5 ....6.45
Massillon,O. R2, R8 ....5.90
Midland,Pa. C18 .....5.90
Monaca,Pa. S17 .....5.90
Newark,N.J. W18 .....6.35
NewCastle,Pa.(17) B4 ...5.90
Pittsburgh J5 .....5.90
Plymouth,Mich. P5 ....6.15
Putnam,Conn. W18 .....6.45
Readville,Mass. C14 ....6.45
S.Chicago,Ill. W14 .....5.90
SpringCity,Pa. K3 .....6.35
Struthers,O. Y1 .....5.90
Waukegan,Ill. A7 .....5.90
Worcester,Mass. W19 ...6.35
Youngstown F3, Y1 ....5.90

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19..5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....7.425
BeaverFalls,Pa.M12,R2 7.425
Bethlehem,Pa. B2 .....7.425
Buffalo B5 .....7.425
Camden,N.J. P13 .....7.60
Canton,O. T7 .....7.425
Carnegie,Pa. C12 .....7.425
Chicago W18 .....7.425
Cleveland A7, C20 .....7.425
Detroit R7 .....7.425
Detroit B5, P17 .....7.625
Donora,Pa. A7 .....7.425
Elyria,O. W8 .....7.425
Gary,Ind. R2 .....7.425
GreenBay,Wis. F7 .....7.425
Hammond,Ind. L2, M13.7.425
Hartford,Conn. R2 ....7.725
Harvey,Ill. B5 .....7.425
Lackawanna,N.Y. B2 ..7.425
LosAngeles S30 .....9.10
Mansfield,Mass. B5 ...7.725
Massillon,O. R2, R8 ...7.425
Midland,Pa. C18 .....7.425
Monaca,Pa. S17 .....7.425
Newark,N.J. W18 .....7.60
Plymouth,Mich. P5 ...7.625
S.Chicago W14 .....7.425
SpringCity,Pa. K3 ....7.60
Struthers,O. Y1 .....7.425
Warren,O. C17 .....7.425
Waukegan,Ill. A7 .....7.425
Worcester,Mass. A7 ...7.725
Youngstown F3, Y1 ....7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....4.65
Altanta A11 .....4.85
Birmingham C15 .....5.15
Buffalo R2 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 .....5.35
Ft.Worth,Tex.(42) T4 ...5.10
Gary,Ind. U5 .....4.65
Houston S5 .....4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 4.65
KansasCity,Mo. S5 ..... 4.90
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.35
Milton,Pa. M18 ..... 4.65
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... 5.00
Pittsburg,Calif. C11 .... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
SandSprings,Okla, S5 .. 5.15
Seattle B3, N14 ..... 5.40
S.Chicago R2 ..... 4.65
S.Duquesne,Pa. U5 .... 4.65
S.SanFrancisco B3 .... 5.40
SparrowsPoint,Md. B2 .. 4.65
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif. C11 .... 5.35
Youngstown R2, U5, Y1 4.65

BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2 6.15
KansasCity,Kans. S5 .. 6.45
Lackawanna,N.Y. B2 .. 6.17
Marion,O. P11 ..... 5.90
Pittsburgh U8 ..... 6.17
Seattle B3, N14 ..... 6.60
SparrowsPt. ½-1" B2 .. 6.15
Williamsport, Pa. S19 .. 6.00

RAIL STEEL BARS

Avis,Pa.(3) J8 ..... 4.50
ChicagoHts.(3) C2, I-2.. 4.65
ChicagoHts.(4) C2, I-2.. 4.65
Ft.Worth,Tex.(26) T4... 5.10
Franklin,Pa. (3) F5 .... 4.65
Franklin,Pa.(4) F5 .... 4.65
Marion,O.(3) P11 ..... 4.65
Moline,Ill.(3) R2 ..... 4.65
Tonawanda(3) B12 .... 4.50
Tonawanda(4) B12 .... 4.65
Williamsport,Pa.(3) S19 4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks. (S.R.) L5 .. 11.50
McK.Rks. (D.R.) L5 .. 16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.325
Allenport,Pa. P7 ..... 4.325
Ashland,Ky.(8) A10 .. 4.325
Cleveland J5, R2 ..... 4.325
Conshohocken,Pa. A3 .. 4.375
Detroit(8) M1 ..... 4.425
Dravosburg,Pa. U5 .... 4.325
Ecorse,Mich. G5 ..... 4.425
Fairfield,Ala. T2 ..... 4.325
FairlessHills,Pa. U5 .. 4.375
Fontana,Calif. K1 .... 5.075
Gary,Ind. U5 ..... 4.325
Geneva,Utah C11 ..... 4.425
GraniteCity,Ill. G4 .... 4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Kokomo,Ind. C16 .... 4.425
Lackawanna,N.Y. B2 .. 4.325
Mansfield,O. E6, (37) .. 4.325
Munhall,Pa. U5 ..... 4.325
Newport,Ky.(8) N9 .. 4.325
Niles,O. N12 ..... 4.325
Pittsburg,Calif. C11 .. 5.025
Pittsburgh J5 ..... 4.325
Portsmouth,O. P12 .... 4.325
Riverdale,Ill. A1 ..... 4.55
Sharon,Pa. S3 ..... 4.325
S.Chicago,Ill. W14 .... 4.325
SparrowsPoint,Md. B2 4.325
Steubenville,O. W10 .. 4.325
Warren,O. R2 ..... 4.325
Weirton,W.Va. W6 .... 4.325
Youngstown U5, Y1 .. 4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 ..... 5.625
Kokomo,Ind. C16 .... 5.475
Niles,O. N12 ..... 5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 .... 7.20
Youngstown Y1 ..... 7.20

SHEETS, H.R.(14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.375
Conshohocken,Pa. A3 .. 6.425
Dravosburg,Pa. U5 .... 6.375
Ecorse,Mich. G5 .... 6.475
Fairfield,Ala. T2 .... 6.375
FairlessHills,Pa. U5 .. 6.425
Fontana,Calif. K1 .... 7.125
Gary,Ind. U5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 .. 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
Sharon,Pa. S3 ..... 6.375
S.Chicago,Ill. U5 .... 6.375
SparrowsPoint(36) B2.. 6.375
Warren,O. R2 ..... 6.375
Weirton,W.Va. W6 .... 6.375
Youngstown U5, Y1.... 6.375

SHEET, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 .. 4.575
Ind.Harbor,Ind. I-2 ...4.575

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 5.325
Cleveland J5, R2 ..... 5.325
Conshohocken,Pa. A3 .. 5.375
Dravosburg,Pa. U5 .... 5.325
Detroit M1 ..... 5.325
Ecorse,Mich. G5 ..... 5.425
Fairfield,Ala. T2 ..... 5.325
FairlessHills,Pa. U5 .. 5.375
Follansbee,W.Va. F4 .. 5.325
Fontana,Calif. K1 .... 6.425
Gary,Ind. U5 ..... 5.325
GraniteCity, Ill. G4 .... 5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 .. 5.325
Mansfield,O. E6 ..... 5.325
Middletown,O. A10 .... 5.325
Newport,Ky. N9 ..... 5.325
Pittsburg,Calif. C11 .. 6.275
Pittsburgh J5 ..... 5.325
Portsmouth,O. P12 .... 5.325
SparrowsPoint,Md. B2.. 5.325
Steubenville,O. W10 .. 5.325
Warren,O. R2 ..... 5.325
Weirton,W.Va. W6 .... 5.325
Youngstown Y1 ..... 5.325

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 .... 7.875
Dravosburg,Pa. U5 .. 7.875
Ecorse,Mich. G5 ..... 7.975
FairlessHills,Pa. U5 .. 7.925
Fontana,Calif. K1 .... 8.975
Gary,Ind. U5 ..... 7.875
IndianaHarbor,Ind. Y1 7.875
Lackawanna(37) B2 .. 7.875
Pittsburgh J5 ..... 7.875
SparrowsPoint(38) B2.. 7.875
Warren,O. R2 ..... 7.875
Weirton,W.Va. W6 .... 7.875
Youngstown Y1 ..... 7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky.	A10.6.90	...
Canton,O.R2	....6.10	6.55
Dravosburg	U5 ..6.10	...
Fairfield	T2 ....6.10	...
Gary,Ind.	U5 ....6.10	6.35
Ind.Harbor	I-2 ..6.10	6.35
Kokomo,Ind.	C16.6.20	...
MartinsFry.	W10.6.10	...
Newport,Ky.	N9..6.10	6.35
Pitts.,Calif.	C11..6.85	...
SparrowsPt.	B2..6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....7.15
Gary,Ind. U5 .....6.35
MartinsFry.,O. W10 ....6.35

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....5.85‡
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85‡
Dover,O. R1 .....5.85*
Dravosburg,Pa. U5 ...5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 .....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ....5.85†
Newport,Ky. N9 .....5.85‡
Niles,O. N12 .....6.85‡
Pittsburg,Calif. C1 ....6.60*
SparrowsPt.,Md. B2 ..5.85†
Steubenville,O. W10 ...5.85‡
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ....5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.575

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25
Niles,O. N12 .....7.25

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 ....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .8.50
Butler,Pa. A10 (type 2) .8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. N12 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ....7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....6.25
Niles,O. N12 .....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ...6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Division H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div. Sharon Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Follak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Whickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ..4.325
Allenport, Pa. P7 .....4.325
Alton, Ill. L1 .....4.50
Ashland, Ky. (8) A10 ..4.325
Atlanta A11 .....4.525
Bessemer, Ala. T2 .....4.325
Birmingham C15 .....4.825
Bridgeport, Conn. N19 ..4.625
Buffalo (27) R2 .....4.325
Conshohocken, Pa. A3 ..4.375
Detroit M1 .....4.425
Ecorse, Mich. G5 .....4.425
Fairfield, Ala. T2 .....4.325
Fontana, Calif. K1 .....5.075
Gary, Ind. U5 .....4.325
Ind. Harbor, Ind. I-2, Y1 4.325
Johnstown, Pa. (25) B2. .4.325
Lackaw'na, N.Y. (24) B2 4.325
Los Angeles (25) B3 ....5.075
Milton, Pa. M18 .....4.325
Minnequa, Colo. C10 ..5.425
New Britain (10) S15 ..4.325
N. Tonawanda, N.Y. B11 4.325
Pittsburg, Calif. C11 ..5.075
Portsmouth, O. P12 ....4.325
Riverdale, Ill. A1 .....4.55
San Francisco S7 .....5.05
Seattle (25) B3 .....5.325
Seattle N14 .....5.40
Sharon, Pa. S3 .....4.325
S. Chicago, Ill. W14 ....4.325
S. San Francisco (25) B3 .5.075
Sparrows Point, Md. B2 ..4.325
Sterling (1) N15 .....4.325
Sterling, Ill. N15 .....4.425
Torrance, Calif. C11 ...5.075
Warren, O. R2 .....4.325
Weirton, W. Va. W6 ....4.325
Youngstown U5 .....4.325

STRIP, Hot-Rolled Alloy

Bridgeport, Conn. N19 ..7.50
Carnegie, Pa. S18 .....7.20
Fontana, Calif. K1 ....8.85
Gary, Ind. U5 .....7.20
Ind. Harbor, Ind. Y1 ....7.20
Los Angeles B3 .....8.40
Newport, Ky. N9 .....7.20
Sharon, Pa. S3 .....7.20
S. Chicago W14 .....7.20
Youngstown U5, Y1 ....7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer, Ala. T2 ....6.425
Conshohocken, Pa. A3 ..6.425
Ecorse, Mich. G5 .....6.525
Fairfield, Ala. T2 .....6.425
Fontana, Calif. K1 ....7.525
Gary, Ind. U5 .....6.425
Houston S5 .....6.675
Ind. Harbor, Ind. I-2, Y1 6.425
Kansas City, Mo. S5 ....6.675
Lackawanna, N.Y. B2 ..6.425
Los Angeles (25) B3 ....7.175
Seattle (25) B3 .....7.425
Sharon, Pa. S3 .....6.425
S. San Francisco (25) B3. 7.175
Sparrows Point, Md. B2. .6.425
Warren, O. R2 .....6.425
Weirton, W. Va. W6 ....6.425
Youngstown U5, Y1 ..6.425

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ..4.575

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 ....6.25
Baltimore T6 .....6.25
Boston T6 .....6.80
Buffalo S40 .....6.25
Cleveland J5 .....6.25
Cleveland A7 .....6.25
Conshohocken, Pa. A3 ...6.30
Dearborn, Mich. D3 ....6.35
Detroit D2, M1, P20 ...6.35
Dover, O. G6 .....6.25
Ecorse, Mich. G5 .....6.35
Follansbee, W. Va. F4 ..6.25
Fontana, Calif. K1 .....8.10
Franklin Park, Ill. T6 ...6.35
Ind. Harbor, Ind. I-2 ....6.35
Ind. Harbor, Ind. Y1 ...6.25
Indianapolis C8 .....6.40
Lackawanna, N.Y. B2 ..6.25
Los Angeles C1 .....8.30
New Bedford, Mass. R10..6.70
New Britain (10) S15 ...6.25
New Castle, Pa. B4, E5..6.25
New Haven, Conn. A7 ....6.70
New Haven, Conn. D2 ....6.70
New Kensington, Pa. A6..6.25
Pawtucket, R.I. R3 ....6.90
Pawtucket, R.I. N8 ....6.80
Pittsburgh J5 .....6.25
Portsmouth, O. P12 ....6.25
Riverdale, Ill. A1 .....6.35
Rome, N.Y. (32) R6 ....6.25
Sharon, Pa. S3 .....6.25
Sparrows Pt., Md. B2 ...6.25
Trenton, N.J. (31) R5 ...7.50
Wallingford, Conn. W2 ..6.70
Warren, O. R2, T5 ....6.25
Weirton, W. Va. W6 ....6.25
Worcester, Mass. A7 ....6.80
Youngstown Y1 .....6.25
Youngstown C8 .....6.25

STRIP, Cold-Rolled Alloy

Boston T6 .....13.80
Carnegie, Pa. S18 .....13.45
Cleveland A7 .....13.45
Dover, O. G6 .....13.45
Franklin Park, Ill. T6 ..13.45
Harrison, N.J. C18 ....13.45
Indianapolis C8 .....13.60
Pawtucket, R.I. N8 ....13.80
Sharon, Pa. S3 .....13.45
Worcester, Mass. A7 ..13.75
Youngstown C8 .....13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7 .....9.10
Dearborn, Mich. D3 ....9.20
Dover, O. G6 .....9.30
Ecorse, Mich. G5 .....9.20

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol, Conn. W1	...	...	10.80	12.95	15.65
Carnegie, Pa. S18	...	8.95	10.50	12.65	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn, Mich. D3	7.10	9.05	10.60	....	....
Detroit D2	7.10	9.05	10.60	12.75	....
Dover, O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee, W. Va. F4	7.00	8.95	10.50**	....	....
Franklin Park, Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison, N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
New Britain, Conn. (10) S15	7.00	8.95	10.50	12.65	15.35
New Castle, Pa. B4, E5	7.00	8.95	10.50	12.65	....
New Haven, Conn. D2	7.45	9.25	10.80	12.95	....
New Kensington, Pa. A6	7.00	8.95	10.50	....	....
New York W3	...	9.25	10.80	12.95	15.65
Pawtucket, R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale, Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome, N.Y. (32) R6	7.00	8.95	10.50	12.65	15.35
Sharon, Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton, N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford, Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren, O. T5	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester, Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester, Mass. A7	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C, max.

Spring Steel (Tempered)

Bristol, Conn. W1	...	...	14.40	17.60	....
Buffalo, W12	...	...	14.40	....	....
Franklin Park, Ill. T6	...	...	14.90	18.10	21.50
Harrison, N.J. C18	...	...	14.40	17.60	21.00
New York W3	...	...	14.40	17.60	21.00
Trenton, N.J. R5	...	...	14.40	17.60	21.00
Worcester, Mass. W12	...	...	14.40	....	....
Worcester, Mass. A7, T6	...	...	14.40	17.60	21.00
Youngstown C8	...	...	14.75	17.95	21.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
Beech Bottom, W. Va. W10	...	...	9.95	10.95	11.85
Brackenridge, Pa. A4	...	...	9.95	10.95	11.85
Mansfield, O. E6	8.40	9.35	9.95	10.95	11.85
Newport, Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles, O. N12	8.40	9.35	9.95	10.95	....
Vandergrift, Pa. U5	...	9.35	9.95	10.95	11.85
Warren, O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville, O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge, Pa. A4	...	...	10.70	11.70	12.60
Granite City, Ill. G4	8.80*	9.80*	10.40*	11.40*	....
Indiana Harbor, Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift, Pa. U5	....	10.10†	10.70†	11.70†	12.60†
Vandergrift, Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren, O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville, O. A10	...	10.10	10.70	11.70	12.60

	Transformer Grade			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
Beech Bottom, W. Va. W10	12.80	13.35	13.85	14.85
Brackenridge, Pa. A4	12.80	....	....	....
Newport, Ky. N9	12.80	....	....	....
Vandergrift, Pa. U5	12.80	13.35	13.85	14.85
Zanesville, O. A10	12.80§	13.35§	13.85§	14.85§

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge, Pa. A4	....	15.85	17.45	17.95	13.55‡
Butler, Pa. A10	....	....	17.45	17.95	....
Vandergrift, Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren, O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$7.90	$8.15	$8.55
Dravosburg, Pa. U5	7.90	8.15	8.55
Fairfield, Ala. T2	8.00	8.25	8.65
Fairless Hills, Pa. U5	8.00	8.25	8.65
Gary, Ind. U5	7.90	8.15	8.55
Granite City, Ill. G4	8.00	8.25	8.65
Indiana Harbor, Ind. I-2, Y1	7.90	8.15	8.55
Niles, O. R2	7.90	8.15	8.55
Pittsburg, Calif. C11	8.65	8.90	9.30
Sparrows Point, Md. B2	8.00	8.25	8.65
Weirton, W. Va. W6	7.90	8.15	8.55
Yorkville, O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa, Pa. J5	6.575	....	....
Niles, O. R2	7.075	7.275	7.475

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$9.20	$9.45
Dravosburg, Pa. U5	9.20	9.45
Fairfield, Ala. T2	9.30	9.55
Fairless, Pa. U5	9.30	9.55
Gary, Ind. U5	9.20	9.45
Ind. Har. I-2, Y1	9.20	9.45
Pitts., Calif. C11	9.95	10.20
Sp. Pt., Md. B2	9.30	9.55
Weirton, W. Va. W6	9.20	9.45
Yorkville, O. W10	9.20	9.45

BLACK PLATE, (Base Box)

Aliquippa, Pa. J5	$7.00
Dravosburg, Pa. U5	7.00
Fairfield, Ala. T2	7.10
Fairless Hills, Pa. U5	7.10
Gary, Ind. U5	7.00
Granite City, Ill. G4	7.10
Ind. Harbor, Ind. I-2, Y1	7.00
Niles, O. R2	7.00
Pittsburg, Calif. C11	7.75
Sparrows Point, Md. B2	7.10
Warren, O. R2	7.00
Weirton, W. Va. W6	7.00
Yorkville, O. W10	7.00

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg, Pa. U5	6.65
Gary, Ind. U5	6.65
Granite City, Ill. G4	6.75
Ind. Harbor, Ind. Y1	6.65
Yorkville, O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg, Pa. U5	$8.70
Gary, Ind. U5	8.70

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville, O. W10	$9.15

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary, Ind. U5	$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

Alabama City, Ala. R2 ..6.25
Aliquippa, Pa. J5 .....6.25
Alton, Ill. L1 .....6.425
Atlanta A11 .....6.45
Bartonville, Ill. K4 ....6.35
Buffalo W12 .....6.25
Chicago W13 .....6.25
Cleveland A7 .....6.25
Crawfordsville, Ind. M8..6.35
Donora, Pa. A7 .....6.25
Duluth, Minn. A7 .....6.25
Fairfield, Ala. T2 .....6.25
Fostoria, O. (24) S1 ....6.45
Houston S5 .....6.50
Jacksonville, Fla. M8 ...6.77
Johnstown, Pa. B2 .....6.25
Joliet, Ill. A7 .....6.25
Kansas City, Mo. S5 ....6.50
Kokomo, Ind. C16 .....6.35
Los Angeles B3 .....7.20
Minnequa, Colo. C10 ....6.50
Monessen, Pa. P7 .....6.25
Newark 6-8 ga. I-1 ....6.90
N. Tonawanda B11 ....6.25
Palmer, Mass. W12 ....6.55
Pittsburgh, Calif. C11 ...7.20
Portsmouth, O. P12 ....6.25
Rankin, Pa. A7 .....6.25
S. Chicago, Ill. R2 .....6.25
S. San Francisco C10 ....7.20
Sparrows Point, Md. B2 ..6.35
Sterling, Ill. (1) N15 ....6.25
Sterling, Ill. N15 .....6.35
Struthers, O. Y1 .....6.25
Waukegan, Ill. A7 .....6.25
Worcester, Mass. A7 ....6.55

WIRE, MB Spring, High Carbon

Aliquippa, Pa. J5 .....7.90
Alton, Ill. L1 .....8.075
Bartonville, Ill. K4 ....8.00
Buffalo W12 .....7.90
Cleveland A7 .....7.90
Donora, Pa. A7 .....7.90
Duluth, Minn. A7 .....7.90
Fostoria, O. S1 .....7.95
Johnstown, Pa. B2 .....7.90
Los Angeles B3 .....8.85
Milbury, Mass. (12) N6 ..8.20
Minnequa, Colo. C10 ....8.15
Monessen, Pa. P16 .....7.90
Muncie, Ind. I-7 .....8.10
Palmer, Mass. W12 ....8.20
Pittsburg, Calif. C11 ...8.85
Portsmouth, O. P12 ....7.90
Roebling, N.J. R5 .....8.20
S. Chicago, Ill. R2 .....7.90
S. San Francisco C10 ....8.85
Sparrows Pt., Md. B2 ...8.00
Struthers, O. Y1 .....7.90
Trenton, N.J. A7 .....8.20
Waukegan, Ill. A7 .....7.90
Worcester A7, J4, T6, W12..8.20

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....7.60
Alton, Ill. L1 .....7.775
Buffalo W12 .....7.60
Cleveland A7 .....7.60
Donora, Pa. A7 .....7.60
Duluth, Minn. A7 .....7.60
Johnstown, Pa. B2 .....7.60
Kansas City, Mo. S5 ....7.85
Los Angeles B3 .....8.55
Minnequa, Colo. C10 ..7.775
Monessen, Pa. P16 .....7.60
New Haven, Conn. A7 ..7.90
Palmer, Mass. W12 ....7.90
Pittsburg, Calif. C11 ....8.55
Portsmouth, O. P12 ....7.60
Roebling, N.J. R5 .....7.90
S. Chicago, Ill. R2 .....7.60
S. San Francisco C10 ....8.55
Sparrows Point, Md. B2 .7.70
Struthers, O. Y1 .....7.60
Trenton, N.J. A7 .....7.90
Waukegan, Ill. A7 .....7.60
Worcester, Mass. A7 ....7.90

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....12.725
Bartonville, Ill. K4 ....12.65
Buffalo W12 .....12.55
Chicago W13 .....12.55
Cleveland A7 .....12.55
Crawfordsville, Ind. M8.12.65
Fostoria, O. S1 .....12.55
Jacksonville, Fla. M8 ..13.08
Johnstown, Pa. B2 .....12.55
Kokomo, Ind. C16 .....12.55
Minnequa, Colo. C10 ...12.30
Monessen, Pa. P16 .....12.55
Muncie, Ind. I-7 .....12.75
Palmer, Mass. W12 ....12.85
Roebling, N.J. R5 .....12.85
S. San Francisco C10 ....12.90
Waukegan, Ill. A7 .....12.55
Worcester, Mass. A7, T6..12.85

WIRE, Gal'd ACSR for Cores

Bartonville, Ill. K4 ....10.70
Buffalo W12 .....10.70
Johnstown, Pa. B2 .....10.70
Minnequa, Colo. C10 ..10.825
Monessen, Pa. P16 .....10.70
Muncie, Ind. I-7 .....10.90
Pittsburg, Calif. C11 ...11.50
Portsmouth, O. P12 ....10.70
Roebling, N.J. R5 .....11.00
Sparrows Pt., Md. B2 ...10.80

ROPE WIRE (A)

Bartonville, Ill. K4 ....10.55
Buffalo W12 .....10.55
Fostoria, O. (23) S1 ....10.05
Johnstown, Pa. B2 .....10.55
Monessen, Pa. P16 .....10.55
Muncie, Ind. I-7 .....10.75
Palmer, Mass. W12 ....10.85
Portsmouth, O. P12 .....9.75
Roebling, N.J. R5 .....10.85
Sparrows Pt. B2 .....10.65
Struthers, O. Y1 .....10.55
Worcester, Mass. J4 ....10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	....14.15
Monessen,Pa. P16	....14.20
Roebling,N.J. R5	....14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	.....9.00
Baltimore T6	.....9.30
Buffalo W12	.....9.00
Cleveland A7	.....9.00
Crawfordsville,Ind. M8	.9.00
Dover,O. G6	.....9.00
Fostoria,O. S1	.....9.00
FranklinPark,Ill. T6	....9.10
Kokomo,Ind. C16	.....9.00
Massillon,O. R8	.....9.00
Milwaukee C23	.....9.20
Monessen,Pa. P16	.....9.00
Pawtucket,R.I. N8	....9.30
Riverdale,Ill. A1	.....9.10
Rome,N.Y. R6	.....9.00
Trenton,N.J. R5	.....9.30
Worcester A7, T6, W12	.9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	...152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	.154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	..$9.05
Wheeling,W.Va. W10	..9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	..154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (For 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	..$9.35
Bartonville,Ill. K4	....9.45
Buffalo W12	.....9.35
Crawfordsville,Ind. M8	..9.46
Donora,Pa. A7	.....9.35
Duluth,Minn. A7	.....9.35
Johnstown,Pa. B2	.....9.35
Joliet,Ill. A7	.....9.35
Kokomo,Ind. C16	.....9.45
LosAngeles B3	.....10.14
Minnequa,Colo. C10	....9.60
Pittsburg,Calif. C11	....10.43
S.Chicago,Ill. R2	.....9.35
SparrowsPt.,Md. B2	....9.45
Sterling,Ill. N15	.....9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	..$9.65
Bartonville,Ill. K4	....9.75
Buffalo W12	.....9.60
Crawfordsville,Ind. M8	..9.75
Donora,Pa. A7	.....9.65
Duluth,Minn. A7	.....9.65
Johnstown,Pa. B3	.....9.65
Joliet,Ill. A7	.....9.65
Kokomo,Ind. C16	.....9.75
LosAngeles B3	.....10.45
Minnequa,Colo. C10	....9.90
Pittsburg,Calif. C11	....10.13
S.Chicago,Ill. R2	.....9.65
SparrowsPt.,Md. B2	....9.75
Sterling,Ill. N15	.....9.65

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	..$9.70
Bartonville,Ill. K4	....9.80
Buffalo W12	.....9.70
Crawfordsville,Ind. M8	..9.80
Donora,Pa. A7	.....9.70
Duluth,Minn. A7	.....9.70
Johnstown,Pa. B2	.....9.70
Joliet,Ill. A7	.....9.70
Kokomo,Ind. C16	.....9.80
LosAngeles B3	.....10.50
Minnequa,Colo. C10	....9.95
Pittsburg,Calif. C11	....10.50
S.Chicago,Ill. R2	.....9.70
SparrowsPt.,Md. B2	....9.80
Sterling,Ill. N15	.....9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	..175**
Aliquippa J5	.....172‡
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	..181
Donora,Pa. A7	.....175†
Duluth,Minn. A7	.....175†
Fairfield,Ala. T2	.....175†
Houston,Tex. S5	.....180†
Johnstown,Pa. B2	.....179*
Joliet,Ill. A7	.....175†
KansasCity,Mo. S5	....180†
Kokomo,Ind. C16	.....177†
Minnequa,Colo. C10	...180**
Monessen,Pa. P7	.....179*
Pittsburg,Calif. C11	...195†
Rankin,Pa. A7	.....175†
S.Chicago,Ill. R2	....175**
S.SanFrancisco C10	...195**
SparrowsPoint,Md. B2	..181*
Sterling,Ill.(1) N15	....179*

WOVEN Fence, 9-15 ga. Col.

Ala.City,Ala. R2	....162**
Ala.City, 17 ga. R2	...257**
Ala.City, 18 ga. R2	...267**
Allq'ppa,Pa.9-14½ga J5	165‡
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	..168
Donora,Pa. A7	.....162†
Duluth,Minn. A7	.....162†
Fairfield,Ala. T2	.....162†
Houston,Tex. S5	.....167††
Johnstown,Pa.(43) B2	..166
Joliet,Ill. A7	.....162†
KansasCity, Mo. S5	....167†
Kokomo,Ind. C16	.....164†
Minnequa,Colo. C10	...167**
Monessen,Pa. 9 ga. P17	.166*
Pittsburg,Calif. C11	....185†
Rankin,Pa. A7	.....162†
S.Chicago,Ill. R2	....162**
Sterling,Ill.(1) N15	....166*

Wire (16 Gage)	An'ld Galv. Stone	Stone
Ala.City R2	...14.50	16.05**
Bartonville K4	..14.60	16.50
Buffalo W12	....14.50	....
Cleveland A7	....14.50	....
Crawf'dsville M8	14.60	16.50
Fostoria,O. S1	..14.60	16.15†
Johnstown B2	..14.15	16.40*
Kokomo C16	..14.60	16.15†
Minnequa C10	.14.75	16.45**
Palmer,Mass W12	14.50	16.05*
Pittsburg,Calif. C11	.14.85	16.40†
S.Chicago R2	..14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	..14.50	16.05†
Worcester A7	....14.60	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	7.40 7.80**
Aliquippa J5	....7.40 7.925‡
Atlanta A11	.....7.50 8.10
Bartonville(48) K4	7.50 8.075
Buffalo W12	....7.40 8.80†
Cleveland A7	....7.40 ....
Crawfordsville M8	7.50 8.075
Donora,Pa. A7	....7.40 7.80†
Duluth,Minn. A7	..7.40 7.80†
Fairfield T2	....7.40 7.80†
Houston,Tex. S5	..7.65 8.05†
Jacks'ville,Fla. M8	7.90 8.475
Johnstown B2(48)	7.40 7.975*
Joliet,Ill. A7	....7.40 7.80†
KansasCity,Mo. S5	7.65 8.05†
Kokomo C16	....7.50 7.90†
LosAngeles B3	..8.35 8.925*
Minnequa C10	...7.65 8.05**
Monessen P7 (48)	7.40 7.975*
Palmer,Mass. W12	7.70 8.10†
Pitts.,Calif. C11	..8.35 8.75†
Portsmouth,O. P12	7.40 ....
Rankin A7	.....7.40 7.80†
S.Chicago R2	....7.40 7.80**
S.SanFran. C10	..8.35 8.75**
Spar'wsPt.B2(48)	7.50 8.075*
Str'ling(1)(48)N15	7.40 8.00††
Struthers,O.(48)Y1	7.40 7.90‡
Worcester,Mass.A7	7.70 ....

*Based on 12.50c zinc; †5c zinc; ‡10c zinc; **Subject to zinc equalization extras. ††13c zinc.

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)

†½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55
Under-Size Body (rolled thread; not nutted): ½" x 6" and smaller.	61

†½" x 4" and smaller and shorter are not nutted.

NUTS

Reg. & Heavy Square Nuts, all sizes	61
H. P. Reg. & Heavy Hex Nuts:	
¾" & smaller	64
⅞" to 1¼" incl.	63
1⅛" to 1½" incl.	65
1⅝" & larger	61
C.P. Reg. & Heavy Hex Nuts	
¾" & smaller	64
⅞" & larger	61
Semifinished & Finished Nuts	
¾" & smaller	66
⅞" & larger	63
Semifinished Slotted Reg. & Heavy Hex Nuts	
¾" & smaller	66
⅞" & larger	63
Hot Galvanized Nuts, all types	
1½" & smaller	44

(On above items, add 25% for less than case quantities)

CAP SCREWS

(New Std., hexagon head, upset, packages)

Bright:	
6" and shorter:	
¼" through ½" diam.	34
⅝" & ¾" diam.	31
⅞", 1⅛", 1"	8
Longer than 6"	
¼" through ¾" diam.	3
¼" through 1" diam.	+13
High Carbon, Heat-treated:	
6" and shorter:	
¼" through ½" diam.	20
⅝" & ¾" diam.	16
⅞", 1⅛", 1"	+11
Longer than 6"	
¼" through ¾" diam.	+23
⅞" through 1" diam.	+41

(New Std. Hexagon head, upset, bulk)

Bright:	
½" x 6" & smaller & shorter	49
⅝" & ¾" diam. x 6" & shorter	48
⅞", 1⅛", 1" x 6" & shorter	31
High Carbon, Heat-treated:	
½" x 6" & smaller & shorter	41
⅝" x ¾" diam. & 6" & shorter	39
⅞", 1⅛", 1" x 6" & shorter	20

MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)

No. 2 to ¼" incl., Square:	
25,000 to 199,999 pieces	20
200,000 or more pieces	27
No. 2 to ⅜" incl., Hex.:	
25,000 to 199,999 pieces	18
200,000 or more pieces	25

MACHINE SCREWS, SLOTTED (Bulk)

No. 2 to ¼" diam. incl.:	
25,000 to 199,999 pieces	20
200,000 or more pieces	27
⅝" to ½" diam. incl.:	
15,000 to 99,999 pieces	20
100,000 or more	27

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	23.45
1½	13	23.31	27.87	22.61
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.60
2¾	12	41.57	49.16	40.31
2¾	12	45.00	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All No. 2	Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	....	....	....
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	...(16)	5.65
Lackawanna,N.Y. B2	4.725	4.625	....	5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield,Ala. T2	.....5.625
Gary,Ind. U5	.....5.625
Ind.Harbor,Ind. I-2	...5.625
Lackawanna,N.Y. B2	...5.625
Minnequa,Colo. C10	...5.625
Seattle B3	.....5.775
Steelton,Pa. B2	.....5.625
Torrance,Calif. C11	...5.775

TRACK BOLTS (20) Treated

Cleveland R2	.....12.40
KansasCity,Mo. S5	....12.40
Lebanon,Pa. B2	.....12.40
Minnequa,Colo. C10	...12.40
Pittsburgh O3, P14	....12.40
Seattle B3	.....12.90

AXLES

Ind.Harbor,Ind. S13	...7.25
Johnstown,Pa. B2	.....7.25

JOINT BARS

Bessemer,Pa. U5	....5.825
Fairfield,Ala. T2	.....5.825
Ind.Harbor,Ind. I-2	...5.825
Joliet,Ill. U5	.....5.825
Lackawanna,N.Y. B2	..5.825
Minnequa,Colo. C10	..5.825
Steelton,Pa. B2	.....5.825

SCREW SPIKES

Cleveland R2	.....11.90
Pittsburgh O3	.....11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	....7.90
Ind.Harbor,Ind. I-2, Y1	7.90
KansasCity,Mo. S5	....7.90
Lebanon,Pa. B2	.....7.90
Minnequa,Colo. C10	...7.90
Pittsburgh J5	.....7.90
Seattle B3	.....8.40
S.Chicago,Ill. R2	.....7.90
Struthers,O. Y1	.....7.90
Youngstown R2	.....7.90

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98+% Fe, annealed.	9.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	8.25
Minus 20 mesh	9.00
Swedish, c.l.f. Camden, N. J., c.l. in bags.	9.50
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, fo.o.b. Shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns.	83.00-148.00
Aluminum:	
Atomized, 500 lb. drum frght. allowed	
Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.00-50.00†
Bronze, 5000-lb lots	61.25-64.50†
Copper:	
Electrolytic	56.75
Reduced	56.75
Lead	22.80
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	58.75-61.50†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc, 5000-lb lots	18.75-32.50‡
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb.	4.65
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni, **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. F6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5	7
Fontana, Calif. K1	...	...	....	....	....	....	6	+11.25	9	+7.25	11.5	+3.75	14	+2.5
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B2	15.5	+13	7	+18.5	+1.5	+26	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Wheatland, Pa. W9	17.5	+11	9	+16.5	0.5	+24	17.5	0.25	20.5	4.25	23	7.75	25.5	9

Size—Inches	1⅛		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	...	....	...
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Fontana, Calif. K1	14.5	+1.5	15	+1	16.5	+0.75	16.5	+0.75	7	+10.75	7	+10.75
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sparrows Pt., Md. B2	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Wheatland, Pa. W9	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	36.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	35.75	44.00	42.25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless:	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
302	...	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	43.95	59.55	....
Copper*	....	....	46.00

	Strip, Carbon Base—Cold Rolled 10%	Strip, Carbon Base—Cold Rolled Both Sides
Copper*	30.00	38.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Alabama City, Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward, Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda, N.Y. W12	58.50	59.00	59.50	60.00
N. Tonawanda, N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester, N.Y. deld.	61.52	62.02	62.52	....
Syracuse, N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Gary, Ind. U5	58.50	....	59.00	....
S. Chicago R2	58.50	....	59.00	....
S. Chicago, Ill. Y1	58.50	59 00	59.00	59.50
S. Chicago, Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon, Mich. deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron, O., deld.	61.25	61.75	61.75	62.25
Lorain, O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem, Pa. B2	60.50	61.00	61.50	62.00
New York, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro, Pa. B10	60.50	61.00	61.50	62.00
Chester, Pa. P14	60.50	61.00	61.50	....
Philadelphia, deld.	62.16	62.66	63.16	....
Steelton, Pa. B2	60.50	61.00	61.50	62.00
Swedeland, Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy, N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
Neville Island, Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKees Rocks, deld.	....	60.04	60.04	60.54
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona, Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer, Pa. U5	58.50	....	59.00	59.50
Clairton, Rankin, S. Duquesne, Pa. U5	58.50	....	....	....
McKeesport, Pa. N3	58.50	....	....	59.50
Midland, Pa. C18	58.50	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard, O. Y1	....	....	59.00	....
Sharpsville, Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield, O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie, Pa. I-3	58.50	59.00	59.00	59.50
Everett, Mass. E1	62.00	62.50	63.00	....
Fontana, Calif. K1	64.50	65.00	....	....
Geneva, Utah C11	58.50	59.00	....	....
Granite City, Ill. G4	60.40	60.90	61.40	....
Ironton, Utah C11	58.50	59.00	....	....
Lone Star, Texas L6	....	55.00*	....	....
Minnequa, Colo. C10	60.50	61.00	61.50	....
Rockwood, Tenn. T3	....	55.00‡	59.00	....
Toledo, O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75%; $56. Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson, O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	*$91.00*
Keokuk, Iowa, (Open-hearth & Fdry, freight allowed K2)	90.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	93.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$72.50
Steelton, Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy, N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP		BARS			Standard Structural	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.§	H.R. Alloy 4140††‡	Shapes	Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	....	7.63	7.49	9.48
Baltimore	7.03	8.32	8.37	....	7.65	...	7.61	8.62¹	13.44	7.93	7.21	8.87
Birmingham	6.80	7.90	8.85	....	7.06	...	7.08	9.35	....	7.28	6.99	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
Chattanooga	6.95	8.10	8.60	....	7.20	...	7.20	9.18	....	7.45	7.25	9.05
Chicago	6.80	8.09	8.50	49.05	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	8.08	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	8.09	8.85	49.16	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.10	8.20	9.20	....	7.40	...	7.40	9.44	....	7.60	7.45	9.30
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.18	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
Moline, Ill.	7.15	8.44	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
Pittsburgh	6.80	8.09	9.20	49.00	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.38	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25¹	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00¶	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **⅜-in. and heavier; ††as annealed; §§under ⅛-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; ¹—500 to 9999 lb; ²—400 to 999 lb; ³—4000 lb and over; ⁴—1000 to 1999 lb; ⁵—1000 lb and over; ⁶—1500 to 3999 lb; ⁷—2000 to 3999 lb; ⁸—f.o.b. local delivery in lots of 10,000 lb and over.

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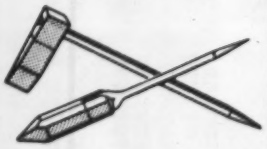

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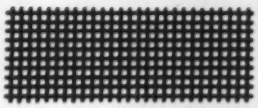

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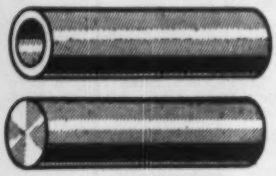

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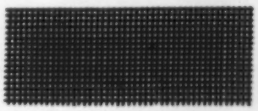

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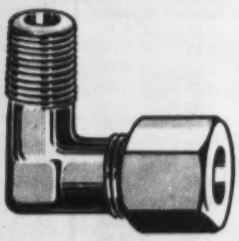

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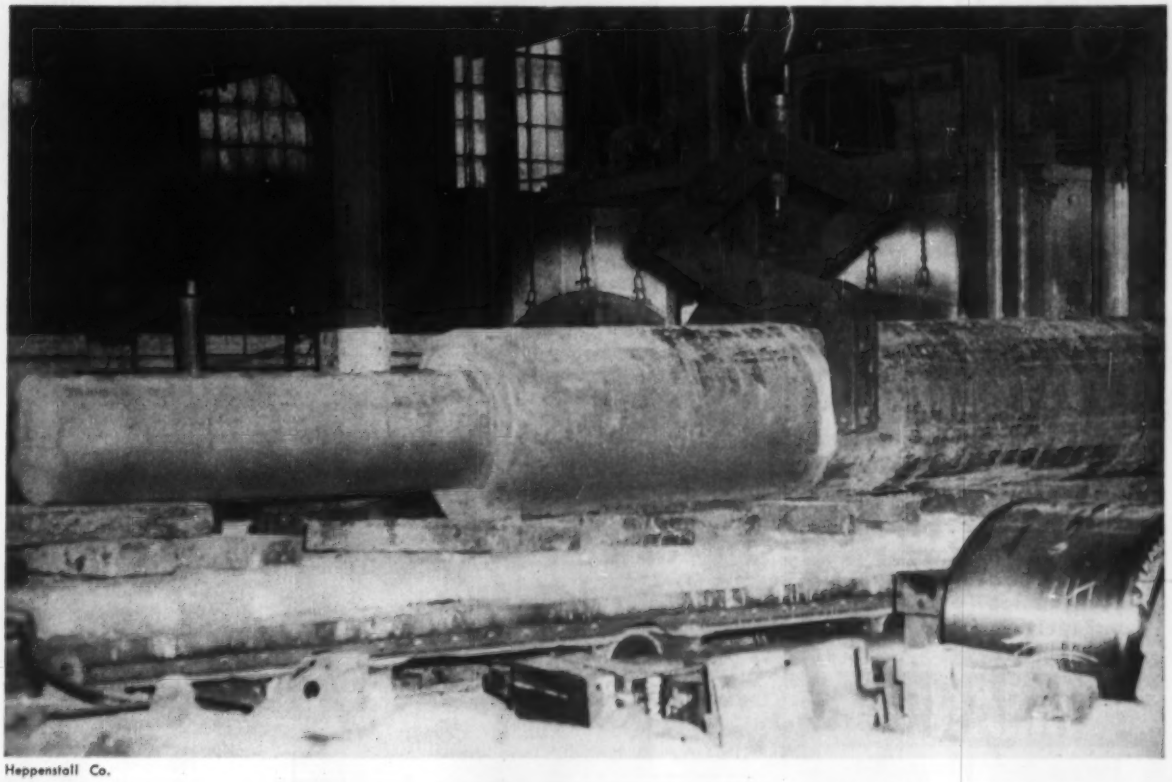

Heppenstall Co.

Tongs lower a 73,500-lb forging before heat treating

Forging Steel: Not Enough

A LEADING producer of nickel-alloy forging steel caught an employee stealing nickel from its warehouse for sale on the gray market. The incident points up a situation: While that metal lacks the luster of gold, it's just as valuable to nickel-starved buyers of forging steel.

Users aren't stealing nickel to bolster supply, but they'll consider any legitimate alternative.

Nickel has been diverted from the stockpile since March. The latest diversion (for the November-December period) totals 8.2 million lb. One hitch: Part of the nickel diverted is of a quality expensive to use in steelmaking. Diversions for the first quarter of next year are expected to be at or close to the present rate.

Who's Hurt—Stainless producers have complained of the nickel shortage for several years, but the scarcity extends across a wide range of metalworking—for example, turbine and generator shafting and gears and a host of other manufactured products requiring alloy-nickel forging steel billets, blooms and slabs.

Stainless and alloy steels use a lot more nickel than is required for forging steel. In one large corporation, forging steel is allotted 50,000 lb of nickel a month, while stainless steel uses 400,000 lb.

Sold Out—"It's impossible for us to get more of our firm's nickel allotment," says one forging sales manager. "Stainless and alloy production use six to eight times as much nickel, and that output has been trimmed by the nickel shortage in a period of high demand for stainless. No one is getting enough nickel in our firm."

The U. S. Bureau of Mines says stainless steels used 30.7 million lb of nickel in 1947, 41.8 million lb in 1950 and 40.8 million lb last year.

Other steels used 34.8 million lb in 1947, 35.6 million lb in 1950 and only 27.3 million lb last year.

While forging's share of nickel declines, new orders for forgings requiring nickel continue to increase.

Problem—How can the orders be filled? The Air Force, the Atomic Energy Commission and the government stockpile take big chunks of nickel production. As long as their purchasing programs stay high, nickel will be hard to get.

Only Chance—Forging steelmakers find that in some cases substitutions provide the answer to the nickel shortage. In several gear applications, fabricators use chrome-molybdenum alloys instead of nickel-bearing alloy steel with no loss of strength. "Our customers are accustomed to the nickel shortage by now," report officials of Erie Forge & Steel Co., Erie, Pa. "Many of them volunteer to work out substitutes for nickel in their products."

Despite co-operation by customers, complete substitution of other alloy grades for nickel-bearing grades is impossible. Fabricators must have nickel in applications demanding top service under corrosive or high-temperature, high-pressure conditions.

No Substitutes—There's no substitute for 3-per-cent nickel in turbine and generator shafts in power equipment. Nickel is essential in aircraft gearing and in shafting used for ships.

Most new orders for shafting are for the Navy's shipbuilding program. Orders are increasing rapidly, but producers are assured of enough nickel because the shafts are needed for defense.

Gearmakers have lost production

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because of the nickel shortage. Nickel is needed for gears that must have great shock resistance and toughness (as in off-the-road equipment and large trucks). Not all gearmakers use nickel, but those who do have scanty supplies.

Perennial Problem—"Users will have to live with the nickel shortage for some time." That's the discouraging prediction of forgers. Charles H. Smith, Steel Improvement & Forge Co., Cleveland, says: "There is a great shortage of nickel steel for nonrated orders." Reports another user of nickel-bearing forging steel: "In the first quarter we'll get 40 per cent of what we need."

Despite the constant temptation to divert all available nickel to badly needed stainless production, integrated mills insist they will maintain a "fair distribution of nickel." Forging steel sales managers are trying to reassure customers that they won't be forgotten. But producers and users agree that the shortage will grow more severe before it lessens.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 153 & 154

Sheet demand continues strong, with the mills sold out for the first quarter on all the major grades and virtually so on specialties. Most first quarter schedules of sellers allow for carry-over of a month to six weeks (some for as much as two months on some grades).

Most consumers will be getting more tonnage in the first quarter of next year than they received in the fourth quarter this year, but quotas will fall below indicated requirements.

New England consumers will be dependent on carry-over shipments until well into February.

Several producers last week announced revisions in extras for hot and cold-rolled sheets. Jones & Laughlin posted an increase in hot-rolled sheet extras of 5 to 15 cents per 100 lb in gage and width extras for 14-gage and lighter; 10 cents for drawing quality and special soundness steels; 10 cents in specification extras for ordinary firebox and higher quality sheets; 10 cents in chemical requirement extras for copper, silicon and carbon (over 0.40 per cent). Changes in cold-rolled extras are 20 cents per 100 lb for drawing quality killed and special soundness steels; 10 cents for copper and silicon chemical requirements. Packaging extras for hot and cold-rolled sheets both were increased by nominal amounts.

Armco Steel Corp., Middletown, O., and Republic Steel Corp., Cleveland, also announced revisions in extras on hot and cold-rolled sheets. Expectations are that other producers will take similar action.

Due to error in transmission, new prices on cold-finished strip recently announced by American Steel & Wire Division, U. S. Steel Corp., were inaccurately reported in the Dec. 5 issue of STEEL.

The new price on cold-rolled at New Haven, Conn., is $6.70 per 100 lb, down $6 per ton from the former price. The Worcester, Mass., price of $6.80 also is off $6 per ton, as is the price of $6.80 on electrogalvanized strip at Worcester. Also, the price on 0.26 to 0.40 carbon, cold-finished spring steel at $7.65 Worcester, is down $6.

The prices on cold-finished spring steel, 0.41 carbon and over, were raised $2 per ton. These were the only advances effected—STEEL had indicated the increase was generally applied on cold-finished strip.

Changes also were made in extras for size, and straightening and cutting, as well as a few revisions in quality and chemistry extras for low carbon strip. Packaging extras also were revised, upward and downward. The changes became effective Dec. 1.

Plates . .

Plate Prices, Page 152

Claymont Steel has resumed operation of the larger of its two plate mills, following a long suspension for repairs. The Claymont, Del., producer should provide some relief in the tight supply situation. This mill has blanked out January production but is accepting business for February shipment.

Generally, plate producers see no change in demand through the first quarter next year. Sales continue heavy and backed up railroad and construction volume will keep them busy through the first half, at the least. Some conversion deals are reported at Pittsburgh.

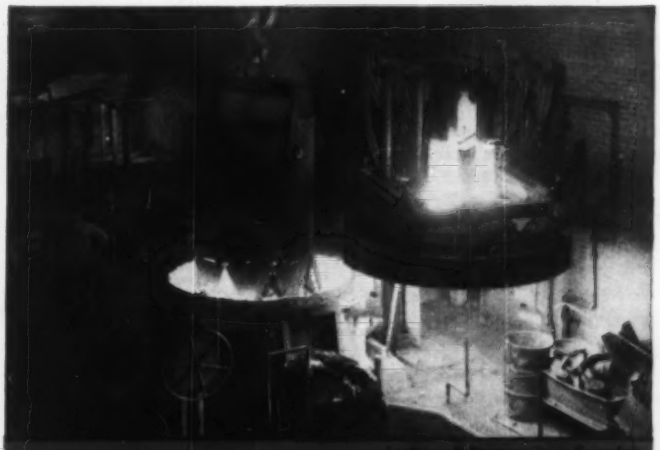
Increasing difficulty is experienced in placing light gage plates in New England. Mill allotments are smaller and, in some cases, are tied in with a given ratio of heavier gages.

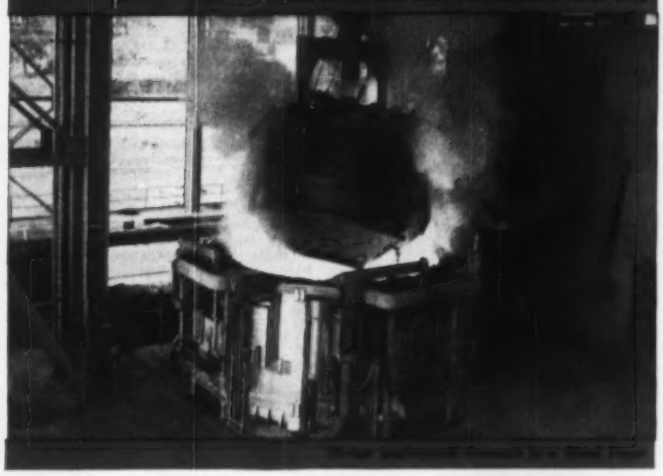
Steel Bars . . .

Bar Prices, Page 152

Hot-rolled carbon bar producers are facing far more first quarter business than they can handle promptly. They are still turning away tonnage orders for the period. Some are booked up completely for the three months; others are accepting orders from month to month.

Some mills can still accept hot-rolled, alloy-bar tonnage for rolling in late February. Deliveries, how-





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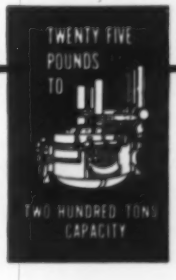


ever, are much more extended on the average, due to extra processing.

Cold-finished barmakers are sold out well into the first quarter. They are having little success in cutting delivery time, with hot-rolled bar deliveries running as much as two months behind schedule.

Farm equipment manufacturers are optimistic over 1956 prospects, despite some uncertainties in the farm situation. With continuing heavy requirements from automotive and general manufacturing industries, pressure on steel bars throughout the first half of next year seems certain.

Bar users in New England are short of supplies. Producers are booking February orders, cutting tonnage around 10 per cent for the third month in some cases.

Tubular Goods . . .

Tubular Goods Prices, Page 156

A. W. McKinney, president, National Supply Co., Pittsburgh, expects his company's sales this year will substantially exceed the previous record of $237.2 million chalked up in 1953. He cities industry forecasts that demand for oil will break all records in 1956.

"Drilling of oil and gas wells is at an unprecedented rate, causing high demand for the pipe and drilling and production equipment that we manufacture," said Mr. McKinney.

New England utilities are finding it difficult to place seamless pipe orders for first quarter delivery.

Trunk pipeline orders extend through next year and will keep seamless supplies tight for other uses. Carbon mechanical tubing deliveries are around six to seven weeks with demand heavier.

Demand for cast iron pipe is seasonally slow.

Wire . . .

Wire Prices, Pages 154 & 155

Specialty wire orders are booked well into January, Leading in demand is hard drawn, oil tempered and spring wire. In merchant wire, seasonal declines are in evidence. Demand for fencing, barbed wire and nails drops with the beginning of winter. Also off are sales of construction items, including welded wire fabric.

Most consumers are getting enough wire to maintain operations, but they are unable to build inventories. Exceptions in New England include the users of upholstery wire. In some cases curtailed coiling schedules are due to failure to anticipate sufficient lead time. Most consumers are buying on a more forward basis.

One of the heaviest inquiries for noncorrosive reinforcing fabric, 600,000 squares, closes with the Corps of Engineers, Memphis, Tenn., Dec. 20. Also required are 10.2 million side twist wires and 1.5 million end twist wires. This office placed a contract for 18,816,000 linear ft of steel wire strand with the Tennessee Coal & Iron Division, U. S. Steel Corp. The American Chain & Cable Co. will supply 7,400,000 ft of tow target cable, costing $216,880, to the Topeka Air Force station.

Structural Shapes . . .

Structural Shape Prices, Page 152

Fabricating shops are becoming booked ahead further. Despite a seasonal decline in construction, more tonnage is being placed than most shops are fabricating. Some of the larger fabricators in the East are promising delivery in 11 to 12 months. At Chicago, they are becoming wary of making new commitments.

Shortage of plain material continues, with no early supply relief in sight. Uncertainty and delayed deliveries are making it difficult for the fabricating shops to fulfill their delivery promises.

Fabricated prices in New England, $25 to $30 a ton higher than at midyear, more accurately reflect plain material and labor costs.

Bridge construction in the Pacific Northwest promises to be active next year.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

13,230 tons, office building for the Tishman interests, 666 Fifth ave., New York, to Bethlehem Steel Co., Bethlehem, Pa.

4650 tons, manufacturing and office building, American Brass Division, Anaconda Wire & Cable Co., Terra Haute, Ind, to Bethlehem Steel Co., Bethlehem, Pa.

3000 tons, power plant unit No. 4, American Gas & Electric Service Corp., Relief, O., to Ingalls Iron Works, Birmingham, Ala.

2425 tons, 14 grade separation structures, Connecticut turnpike, projects 308-01 and 308-02, Westport-Fairfield and Westport, Conn., to American Bridge Division, U. S. Steel Corp., Pittsburgh, through L. G. De Falice & Son Inc., North Haven, Conn., general contractor.

2100 tons, superstructure, St. Lucie canal, Florida state turnpike, to Mount Vernon Bridge Co., Mt. Vernon, O.

1800 tons, four buildings, International Business Machines Corp., Owego, N. Y., to Harris Structural Steel Co., New York.

1610 tons, state highway bridges, Southeast expressway, Boston-Milton, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Savin Construction Co., East Hartford, Conn., general contractor (reported in STEEL, Nov. 21, as involving 1350 tons).

1450 tons, 14-story apartment, 136 E. 55th St., New York, through Emery Roth & Sons, to Harris Structural Steel Co., that city.

1300 tons, seven overpassing structures, Connecticut turnpike, Stratford-Milford, Conn., to Schact Structural Steel Co., New York; D. V. Frione & Co. Inc., New Haven, Conn., general contractor; also 665 tons, steel piles, and 865 tons, reinforcing bars.

1300 tons, office building, Connecticut Mutual Life Co., Hartford, Conn., to Harris Structural Steel Co., New York; Robert Glenn Co., New York and Hartford, general contractor.

1000 tons, transmission towers, Long Island Lighting Co., Hicksville, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

900 tons, research center, General Foods Corp., Tarrytown, N. Y., through George A. Fuller Co., to Grand Iron Works, Bronx, New York.

875 tons, shipping center, Dover, N. J., to Oltmer Iron Works, Jersey City, N. J.

850 tons, contract 537, section 37-K, Lackawanna county, Pennsylvania, through George M. Brewster & Son, general contractor, to Pine Brook Iron Works, Scranton, Pa.

670 tons, science building, University of Connecticut, Storrs, Conn., to Haarmann Steel Co., Holyoke, Mass.; Anderson-Fairoaks Construction Co., Hartford, Conn., general contractor.

620 tons, building, Carborundum Co., Logan, O., through Brown & Matthews, New York, to R. C. Mahon, Detroit.

590 tons, high school, Seaford, N. Y., to Lasker Goldman Corp., general contractor, to Grand Iron Works, Bronx, New York.

550 tons, power plant unit No. 1, Public Service Co. of Colorado, Denver, through Ebasco Services, New York, to Kansas City Structural Steel Co., Kansas City, Kans.

500 tons, carpet plant, Landrum, S. C., through Hanover Construction Co., general contractor, to Southern Engineering Co., Charlotte, N. C.

480 tons, grade crossing, Bruckner boulevard, Bronx, New York, through Frank Mascali & Son, general contractor, to Prospect Iron Works Inc., Brooklyn, N. Y.

440 tons, terminal and office, Associated Transport, Brooklyn, N. Y., through Adson Builders, to Pecker Iron Works Inc., Brooklyn, N. Y.

400 tons, engine parts, Alco Products Inc., Schenectady, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

400 tons, addition, open-hearth department, Alan Wood Steel Co., Conshohocken, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

385 tons, state bridge, Lycoming county, Pa., to the Anthracite Bridge Co., Scranton, Pa.

350 tons, repairs and alterations to Bethlehem ore bridges, Sparrows Point, Md., to Bethlehem Steel Co., Bethlehem, Pa., through McKiernan-Terry Corp.

320 tons, four warehouse buildings for David O. Evans, two at Elizabeth, N. J., and two at Elizabethport, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

260 tons, state bridge, Naugatuck river, Connecticut, to Bethlehem Steel Co., Bethlehem, Pa.; Foundation Corp., New York, general contractor.

225 tons, Long Island Railroad bridge at Manhasset, L. I., through Horn Construction Co., general contractor, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

200 tons, garage, Erie Mining Co., Aurora, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

170 tons, state bridge, Washington county, New York, through Collins Bros., general contractor, to Phoenix Bridge Co., Phoenixville, Pa.

120 tons, cargo building No. 84, Idlewild Airport, Long Island, N. Y., through Laurence J. Rice, to Simon Holland & Son Inc., Brooklyn, N. Y.

STRUCTURAL STEEL PENDING

6000 tons, superstructure and approaches, Morrison street bridge, Portland, Oreg.; bids to John W. West, purchasing agent, Multnomah county, Portland, Oreg., Feb. 1.

3000 tons, superstructure, Fairfax bridge, Missouri river, near Kansas City, Kans.; bids Dec. 15, county clerk, Platte City, Mo.

1295 tons, five grade separation structures, Connecticut turnpike, Milford, Conn.; Lizza & Sons Inc., Oyster Bay, N. Y., low on general contract; also, 555 tons of steel piles; 540 tons, reinforcing bars, and 350 tons, mat reinforcing.

945 tons, six bridges, Connecticut turnpike, Milford-Orange, Conn., Lizza & Sons Inc., Oyster Bay, N. Y., low on general contract; also 670 tons, reinforcing bars, and 410 tons of mat reinforcing.

900 tons, junior high school 61, Brooklyn, N. Y., bids Dec. 19.

900 tons, public school No. 141, Brooklyn, N. Y., bids Dec. 7.

800 tons, junior high school No. 204, Queens, New York, Dec. 1.

600 tons, public school No. 140, Bronx, New York, bids Dec. 15.

530 tons, branch bank building, Portland, Oreg.; bids in.

450 tons, public school No. 261, Brooklyn, N. Y., bids Dec. 13.

425 tons, three bridges, Fall River-Boston expressway, Avon-Brockton-Stoughton, Mass.; bids Dec. 20, state, Boston.

300 tons, pump plant additions, Hanford Works, general contract to Morrison-Knudsen Inc., Seattle, low at $1,809,580; Isaacson Iron Works, Seattle, is low on the structurals.

175 tons, state highway bridges, Stockbridge, Mass.; J. F. Fitzgerald Construction Co., Boston, low on general contract.

125 tons, state highway bridge, Woolwich, Me.; Bridge Construction Co., Augusta, Me., is low on the general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1525 tons, 12 bridges, Connecticut turnpike, Darien-Norwalk and Westport, Conn., to Milton Steel Products Division, Merritt-Chapman & Scott Corp., Milton, Pa.; Savin Construction Co., East Hartford, Conn., general contractor.

1225 tons, 14 grade separations and highway, Connecticut turnpike, projects 308-01 and 308-02, Westport-Fairfield and Westport, Conn., to Truscon Steel Division, Republic Steel Corp., Boston, through L. G. De Falice & Son Inc., North Haven, Conn., general contractor; also, 1150 tons steel bearing piles to Bethlehem Steel Co., Bethlehem.

1040 tons, substructure, bridge, Housatonic river, Connecticut turnpike, Stratford-Milford, Conn., to Milton Steel Products Division, Merritt-Chapman & Scott Corp., Milton, Pa.; Savin Construction Co., East Hartford, Conn., general contractor.

800 tons, overpassing and underpassing structures, Connecticut turnpike, Milford, Conn., Milton Steel Products Division, Merritt-Chapman & Scott Corp., Milton, Pa.; Savin Construction Co., East Hartford, Conn., general contractor.

500 tons, plastics plant, Phillips Chemical Co., Pasadena, Tex., to Peden Iron & Steel Co., Houston, through Farnsworth & Chambers Co. Inc., Houston, general contractor.

250 tons, five steel beam bridges, Spaulding turnpike, Dover, N. H., to Bancroft & Martin Rolling Mills Co., South Portland, Me., through Landers & Griffin Inc., Portsmouth, N. H., general contractor.

100 tons, Washington state highway bridge, Snohomish county, to Northwest Steel Rolling Mills Inc., Seattle; Harry Hawkins, Seattle, general contractor, low at $131,696.

REINFORCING BARS PENDING

123 tons, Washington state T-beam bridge, Adams county; general contract to Goodfellow Bros., Wenatchee, Wash., low at $220,849.

PLATES . . .

PLATES PLACED

875 tons, six roof tanks, Public Service Electric & Gas Co., Linden, N. J., to Hammond Iron Works, Warren, Pa.

500 tons, 7600 ft of 36-in., welded-steel water pipe for Portland, Oreg., system extension; general contract to P. S. Lord Co., Portland, low at $176,438.

190 tons, coke drum supports, Yorktown Va., trough Lummus Co., to A. O. Smith Corp., Milwaukee.

PLATES PENDING

760 tons, bulk storage tanks, Elmendorf and Galena Air Bases, Alaska; bids in to U. S. Engineer.

150 tons, two fuel storage tanks, naval air station, Corpus Christi, Tex.; bids Dec. 21.

100 tons, bulk fuel system storage, Fairchild Air Field, Spokane, Wash.; general contract to Furnace Construction Co., and M. A. Robbins, Redmonds, Wash., low at $200,576.

100 tons, 5000-bbl jet fuel tank and facilities, Paine Air Base, Everett, Wash.; bids to U. S. Engineer, Seattle, Dec. 29.

100 tons, 400,000-gal steel standpipe, also 5000 ft of 8-in. steel pipe; bids to Maude S. Hartman, clerk, Benton City, Wash., Dec. 14.

PIPE . . .

CAST IRON PIPE PENDING

80 tons, system extension; bids to Grants Pass, Oreg.

STEEL PIPE PENDING

400 tons, 29,200 ft of 14-gage steel water pipe, Kirkland, Wash.; Mallory & Compton Inc., Seattle, low at $92,985.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Union Pacific, fifteen 8500-hp gas turbine locomotives, to the General Electric Co., Schenectady, N. Y.; the railroad contemplates ordering 30 additional units.

RAILROAD CARS PLACED

Chicago, Milwaukee & St. Paul, 100 covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

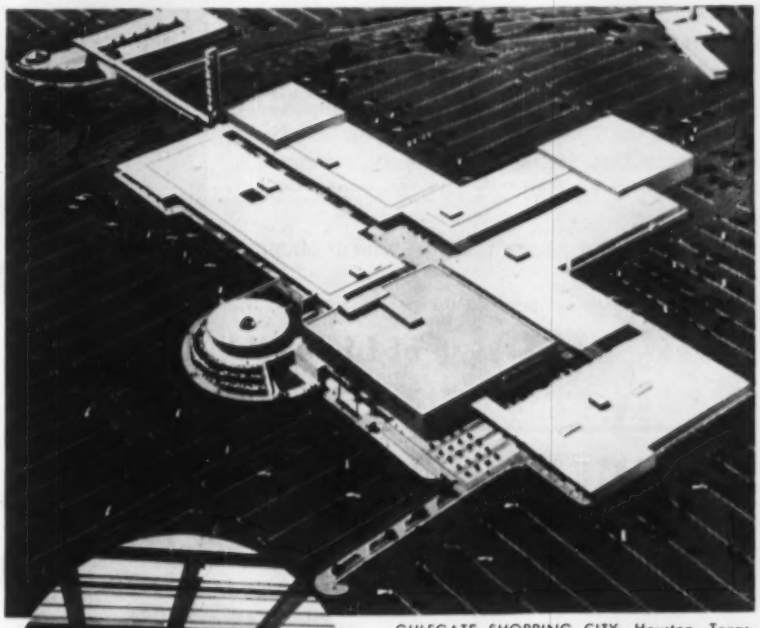
Norfolk & Western, 4000 freight cars, to own shops. The cars comprise 3500 hoppers and 500 gondolas.

Spokane, Portland & Seattle, 500 fifty-ton boxcars to be constructed at shops of the Great Northern Railroad at St. Cloud, Minn.; delivery last quarter of 1956.

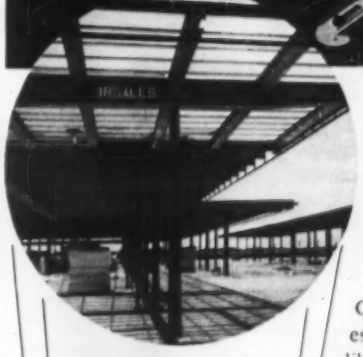
RAILS PLACED

New York Central, 38,800 tons; 21,000 tons going to U. S. Steel Corp., Pittsburgh; 14,000 tons to Bethlehem Steel Co., Bethlehem, Pa.; and 3800 to Inland Steel Co., Chicago. The remaining 1200 tons required for the New York Central's 1956 program of 40,000 tons are along the tracks.

Northern Pacific, 2000 tons of tie plates for 1956 requirements, to Bethlehem Pacific Coast Steel Corp., Seattle.



GULFGATE SHOPPING CITY, Houston, Texas. Architect: John Graham and Company, Seattle. Contractor: Farnsworth and Chambers.



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Shopping Center—Texas Style . . . BIG

Gulfgate Shopping City near Houston, established by Allied Stores Corp., is like most things in Texas . . . big. The $20,000,000 project will house 90 to 100 stores, including Joske's department store with 207,000 square feet of space. Overall, there are 840,000 square feet, facilities to park 20,000 automobiles a day. Steel for this gigantic, modern development was furnished by Ingalls.

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If the cost of solid stainless is holding you back, IngAclad may well be the answer to your problem! IngAclad *stainless-clad* steel saves you money two ways: costs less than solid stainless, easier to fabricate.

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Borg-Warner Corporation
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Plant: New Castle, Indiana

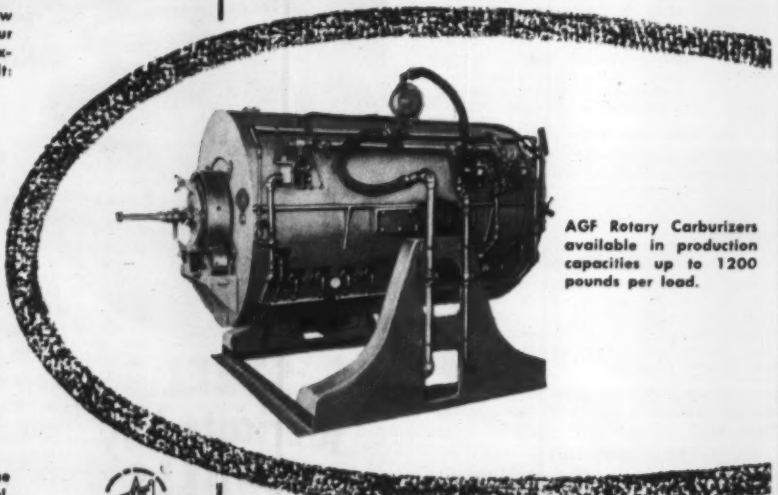
ELIMINATE "Point of Contact" CASE VARIATIONS

Gentle tumbling of the work pieces by slow retort rotation — one revolution every four minutes—assures uniform heating and exposure to the controlled atmosphere. Result: better products.

Your processing costs reduced because . . .

- **only necessary labor required during the charging and discharging operation. Large production lots quickly handled with mechanized tilting.**
- **only the work enters and leaves the furnace retort. Chains, conveyors, trays and other inefficient mechanisms are eliminated.**
- **alloy costs are decreased. The retort remains in the furnace at all times. Rotation and the use of an ample combustion chamber further assure maximum alloy life.**
- **AGF Carburizers are flexible. The same one can be used to clean harden, anneal, normalize, etc. a wide variety of work without modification.**

MIX THE WORK WITH AGF ROTARY GAS CARBURIZERS



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"Pioneers since 1878"

Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $90.50; 19-21% Mn, 1-3% Si, $88; 16-19% Mn, $86.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 21.85c per lb of contained Mn, packed, carload 22.9c, ton lot 24.5c, less ton 25.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 30c; 2000 lb to min carload, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.2c per lb of alloy. Packed, c.l. 12.2c, ton 12.65c, less ton 13.65c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N.Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02 max 38.50c, 0.03% max 38c, 0.06% max 36.50c, 0.1% max 36c, 0.15% max 35.75c, 0.2% max 35.50c, 0.5% max 35.25c, 1.0% max 34c, 1.5% max 33.85c, 2.0% max 33.75c. Ton lot, add 3.1c, less ton add 4.8. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 8 M x D, bulk 27.4c per lb contained Cr. Packed c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.2% min, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.28. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.75c per lb of contained Si. Packed, c.l. 13.85c, ton lot 15.3c, less ton 16.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.95 per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.1c per lb of briquet, c.l. packed, pallets 12.3c, bags 13.1c; 3000 lb to c.l., pallets 13.5; 2000 lb to c.l., bags, 14.3c, less ton 15.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ⅛ lb of Si). Contract, c.l. bulk 12.7c per lb of briquet, c.l. packed, pallets, 12.9c; bags 13.7c, 3000 lb to c.l., pallets, 14.1c; 2000 lb to c.l., bags, 14.9c; less ton 15.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract carload, bulk 6.75c per lb of briquet; packed, pallets, 6.95c; bags, 7.75c; 3000 lb to c.l., pallets, 8.55c; 2000 lb to c.l. bags 9.35c; less ton 10.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packed, pallets 7.1c; bags 7.9c; 3000 lb to c.l. pallets 8.7c; 2000 to c.l. bags 9.5c; less ton 10.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

Silicax Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ⅛" x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17.19%, Mn 8-11%). C.l. packed 17.2c per lb or alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 16.50c. Packed c.l. 17.50c, 2000 lb to c.l. 18.50c, less than 2000 lb 19c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Sigio, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa.; $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

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On 5,000 or 50,000 washers, you get a big DOUBLE SAVINGS with Freeway. You save first on the initial cost . . . due to patented processing dies that keep prices LOW. Next, you save time in your own shop . . . because precision-made Freeway Washers fit fast and right! Quotations promptly submitted.

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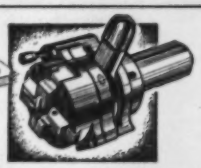

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Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$30.00-$31.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.06-$1.11 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 95c-$1.00.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for deliver to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	*33.00-35.00*

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawston, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawston, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $194; Danville, Ill., $197; Philadelphia, $201.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $241; Danville, Ill., $244; Philadelphia, $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $286.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ⅛-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.25-$14.00
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$25.50
Camden, N. J., ovens	25.00
Everett, Mass., ovens	
New England, deld.	*27.05
Chicago, ovens	25.75
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee, ovens	26.25
Indianapolis, ovens	25.50
Portsmouth, O., ovens	24.75
Cincinnati, deld.	27.34
Painesville, O., ovens	26.25
Cleveland, deld.	28.18
Birmingham, ovens	24.40
Cincinnati, deld.	29.33
Buffalo, ovens	25.75
Buffalo, deld.	27.00
Lone Star, Tex., ovens	19.50
Neville Island, Pa., ovens	25.00
Philadelphia, ovens	25.00
Swedeland, Pa., ovens	25.00
St. Paul, ovens	25.00
Detroit, ovens	26.25
Detroit, deld.	27.25
Pontiac, deld.	27.81
Saginaw, deld.	29.33

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

Diam (Inches)	Length	Per 100 lb
GRAPHITE		
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25
CARBON		
8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

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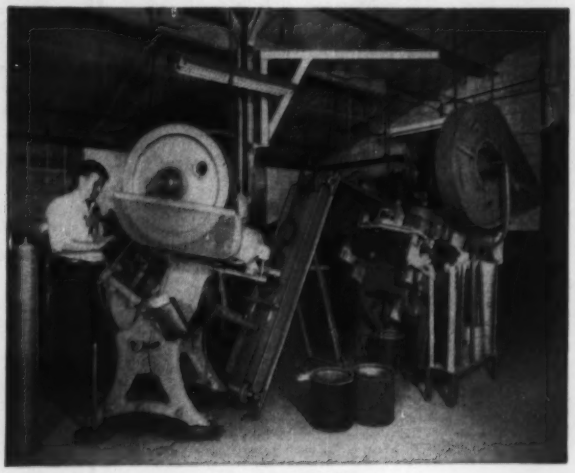
the modern method of handling ferrous parts

Here's how many valuable hours of time are saved in the manufacture of Lima Electric Motors, by The Lima Electric Motor Company. Photo at right shows how Lima uses the Homer "Space-Saver" Magnetic Elevator-Conveyor between presses, in stamping rotor and stator laminations. The Homer "Space-Saver" makes possible tandem operation of two presses—with one operator and permits close grouping of machines. Another "Space-Saver" receives stampings from tandem press and automatically stacks finished laminations without manual assistance.



- **PORTABILITY** — Can be installed as a portable or stationary unit— easily moved from one location to another.
- **ADAPTABILITY** — Built in standard or custom units. Can be used in new or existing production lines.
- **FLEXIBILITY** — Magnetically elevates and conveys nuts, bolts, nails, washers, tin cans, bottle caps, ferrous stampings, etc.

If you have a ferrous material elevating or conveying problem, we suggest you write us today for complete information on HOMER "Space-Saver" Magnetic Elevator-Conveyors.

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DEPT. 149 LIMA, OHIO

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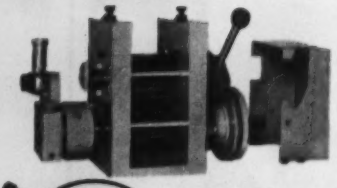

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2523 E. Cumberland Street Philadelphia 25, Pa.

Scrap . . .

Scrap Prices, Page 170

Chicago—Based on broker-dealer trading, the indication is that the current scrap market is from $2 to $4 above the last confirmed purchases by the mills. If sales have been made at these prices, the fact so far is closely held by buyers and brokers—obviously to prevent dealers from boosting their asking prices further.

The situation is pretty well indicated by what is happening in railroad steel, such as No. 1 heavy melting. The last confirmed sale was at $51 a ton. The current quotation is $55, with one broker admitting rejection of a $53 order.

New York—There is a rush of scrap demand from all directions. Quick shipments are being asked in many cases, indicating that consumer inventories are down. In addition to strong domestic demand, there is continued pressure from abroad.

While local brokers have not changed their prices on the prime grades of open-hearth scrap, at least for the moment, they have jumped their prices on No. 2 heavy melting to $39-$40, and on No. 2 bundles to $35-$36. They are paying substantially higher for machine shop turnings at $25-$26; for mixed borings and turnings at $27-$28; and for low phos structural and plate at $45-$46.

Buying prices on No. 1 cupola have been advanced to $42-$43; for unstripped motor blocks to $26-$27; and for heavy breakable cast to $42-$43.

Philadelphia—Scrap prices have advanced sharply, affecting both steel and cast grades. Domestic consumers report competition in the steel grades is especially keen from exporters who have advanced their prices $2 a ton.

In the cast grades, U. S. Steel's Fairless mill is paying $50.50, delivered, for No. 1 cupola. Malleable has shot up to a new high of $62.50, delivered, as compared with the furnace price on pig iron of $61.50. Heavy breakable has advanced to $52, delivered.

No. 1 heavy melting, No. 1 bundles and No. 1 busheling are up $2 to $50, delivered. No. 2 heavy melting is $46 and No. 2 bundles $41. Electric furnace bundles have been sold at as high as $51, delivered.

Cleveland—Quality grades of steelmaking scrap are in demand. Prices continue to push upward. Recent sales in the Valley serve to confirm prices currently quoted, and expectations are that local consumers will make buys within the next few days at present levels.

Buffalo — Firmer tendencies dominate the local scrap market. Last week the steelmaking grades jumped $2 to $4 a ton on substantial purchases by district mills.

Pittsburgh — Strong mill demand supports No. 1 heavy melting scrap at no less than $48 a ton. Prices are moving upward. High-quality grades are in particularly strong demand, with railroad specialties selling at $56 and cut structurals at $51.

Washington—Consumption of ferrous materials (scrap and pig iron) totaled 12,635,000 gross tons in October, up 6 per cent from September, reports the Bureau of Mines. Of this total, 6,443,000 tons were scrap and 6,192,000 tons pig iron.

Stocks of ferrous scrap held by consumers at the end of October were 6,594,000 tons, up slightly from Sept. 30.

Detroit—No. 1 grades, electric furnace and foundry grades of scrap are in heavy demand. No. 2 grades and turnings are not so strong. No. 1 heavy melting is quoted at $44, No. 2, $34.

St. Louis—The scrap market is firm. Shipments are reported insufficient, and the mills are not getting in enough tonnage to balance with daily melts.

(*Please turn to page* 172)

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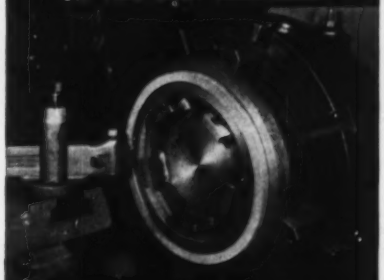

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Dec. 7	$48.83
Nov. 30	47.00
Nov. Avg.	46.08
Dec. 1954	32.58
Dec. 1950	45.50

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*47.00-48.00*
No. 2 heavy melting	41.00-42.00
No. 1 bundles	*47.00-48.00*
No. 2 bundles	37.00-38.00
No. 1 busheling	*47.00-48.00*
Machine shop turnings	30.00-31.00
Mixed borings, turnings	30.00-31.00
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals, 3 ft lengths	*50.00-51.00*
Heavy turnings	42.00-43.00
Punchings & plate scrap	*50.00-51.00*
Electric furnace bundles	48.00-49.00

Cast Iron Grades

No. 1 cupola	*43.00-44.00*
Charging box cast	42.00-43.00
Heavy breakable cast	42.00-43.00
Unstripped motor blocks	30.00-31.00
No. 1 machinery cast	52.00-53.00

Railroad Scrap

No. 1 R.R. heavy melt.	*50.00-51.00*
Rails, 2 ft and under	*61.00-62.00*
Rails, 18 in. and under	*62.00-63.00*
Rails, random lengths	*57.00-58.00*
Railroad specialties	*55.00-56.00*

Stainless Steel Scrap

18-8 bundles & solids	325.00-340.00
18-8 turnings	210.00-220.00
430 bundles & solids	100.00-110.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	49.00-50.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	49.00-50.00
No. 2 bundles	*36.00-37.00*
No. 1 busheling	49.00-50.00
Machine shop turnings	25.00-26.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	49.00-50.00
Cut structural plates 2 ft and under	*55.00-56.00*
Alloy free, short shovel turnings	34.00-35.00
Electric furnace bundles	49.00-50.00

Cast Iron Grades

No. 1 cupola	*50.00-51.00*
Charging box cast	42.00-43.00
Stove plate	*49.00-50.00*
Heavy breakable cast	*40.00-41.00*
Unstripped motor blocks	*32.00-33.00*
Brake shoes	*38.00-39.00*
Clean auto cast	*51.00-52.00*
Burnt cast	38.00-39.00
Drop broken machinery	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*52.00-53.00*
R.R. malleable	*55.00-56.00*
Rails, 2 ft and under	*66.00-67.00*
Rails, 18 in. and under	*67.00-68.00*
Rails, random lengths	*60.00-61.00*
Cast steel	*54.00-55.00*
Railroad specialties	*58.00-59.00*
Uncut tires	*54.00-55.00*
Angles, splice bars	*62.00-63.00*
Rails, rerolling	*66.00-67.00*

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*325.00-335.00*
18-8 turnings	190.00-200.00
430 clips, bundles, solids	*95.00-105.00*
430 turnings	*45.00-55.00*

YOUNGSTOWN

No. 1 heavy melting	52.00-53.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	52.00-53.00
No. 2 bundles	36.00-37.00
No. 1 busheling	52.00-53.00
Machine shop turnings	29.00-30.00
Short shovel turnings	34.00-35.00
Cast iron borings	29.00-30.00
Low phos.	*54.00-55.00*
Electric furnace bundles	47.50-48.50

Railroad Scrap

No. 1 R.R. heavy melt.	52.00-53.00

CHICAGO

No. 1 heavy melting	*48.00-50.00*
No. 2 heavy melting	*39.00-40.00*
No. 1 factory bundles	*50.00-51.00*
No. 1 dealer bundles	*47.00-48.00*
No. 2 bundles	35.00-36.00
No. 1 busheling	*48.00-50.00*
Machine shop turnings	27.00-28.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals, 3 ft	*51.00-52.00*
Punchings & plate scrap	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	49.00-50.00
Stove plate	40.00-41.00
Unstripped motor blocks	37.00-38.00
Clean auto cast	53.00-54.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	*52.00-53.00*
R.R. malleable	58.00-59.00
Rails, 2 ft and under	*67.00-68.00*
Rails, 18 in. and under	*68.00-69.00*
Angles, splice bars	*63.00-64.00*
Rails, rerolling	*73.00-74.00*

Stainless Steel Scrap

18-8 bundles & solids	320.00-335.00
18-8 turnings	225.00-235.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

DETROIT
(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*44.00*
No. 2 heavy melting	*34.00*
No. 1 bundles	*44.00*
No. 2 bundles	*31.00*
No. 1 busheling	*44.00*
Machine shop turnings	*22.00*
Mixed borings, turnings	22.00
Short shovel turnings	24.00
Punchings & plate scrap	*53.00*

Cast Iron Grades

No. 1 cupola	*43.00*
Charging box cast	36.00
Stove plate	34.00
Heavy breakable	35.00
Unstripped motor blocks	22.00
Clean auto cast	*46.00*
Malleable	*40.00*

BIRMINGHAM

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	*42.00-43.00*
No. 2 bundles	*30.00-31.00*
No. 1 busheling	*42.00-43.00*
Cast iron borings	*18.00-19.00*
Short shovel turnings	*29.00-30.00*
Machine shop turnings	*28.00-29.00*
Electric furnace bundles	*47.00-48.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	*50.00-51.00*
Structural plate, 2 ft	*49.00-50.00*
Unstripped motor blocks	36.00-37.00
Charging box cast	30.00-31.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
Rails, 18-in. and under	*61.00-62.00*
Rails, rerolling	*62.00-63.00*
Rails, random lengths	*55.00-56.00*
Angles, splice bars	*57.00-58.00*

PHILADELPHIA

No. 1 heavy melting	*50.00*
No. 2 heavy melting	*46.00*
No. 1 bundles	*50.00*
No. 2 bundles	*41.00*
No. 1 busheling	*50.00*
Electric furnace bundles	*51.00*
Machine shop turnings	*35.00*
Mixed borings, turnings	*35.00*
Short shovel turnings	*38.00*
Heavy turnings	*46.00*
Structurals, & plate	*52.50*
Couplers, springs, wheels	*54.50*
Rail crops, 2 ft & under	*63.00*

Cast Iron Grades

No. 1 cupola	*50.50*
Malleable	*62.50*
Heavy breakable cast	*52.00*
Drop broken machinery	*57.00*

NEW YORK
(Brokers' buying prices)

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	*39.00-40.00*
No. 1 bundles	43.00-44.00
No. 2 bundles	*35.00-36.00*
Machine shop turnings	*25.00-26.00*
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	*28.00-29.00*
Low phos. (structural & plate)	*45.00-46.00*

Cast Iron Grades

No. 1 cupola	*42.00-43.00*
Unstripped motor blocks	*26.00-27.00*
Heavy breakable	*42.00-43.00*

Stainless Steel

18-8 sheets, clips, solids	300.00-310.00
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON
(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	*40.00-41.00*
No. 2 bundles	*30.00-31.50*
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*23.50-24.50*
Short shovel turnings	*26.00-27.00*
No. 1 cast	*37.00-37.50*
Mixed cupola cast	*35.00-35.50*
No. 1 machinery cast	*40.00-40.50*

BUFFALO

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*39.00-40.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*45.00-46.00*
Mixed borings, turnings	*30.00-31.00*
Machine shop turnings	*28.00-29.00*
Short shovel turnings	*31.00-32.00*
Cast iron borings	*31.00-32.00*
Low phos.	*48.00-49.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	*55.00-56.00*
Rails, 3 ft and under	*57.00-58.00*
Railroad specialties	*47.00-48.00*

CINCINNATI
(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*39.00-40.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*35.00-36.00*
No. 1 busheling	*45.00-46.00*
Machine shop turnings	*30.00-31.00*
Mixed borings turnings	*27.50-28.50*
Short shovel turnings	*32.50-33.50*
Cast iron borings	*27.50-28.50*
Low phos., 18 in.	50.00-51.00

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Heavy breakable cast	*42.00-43.00*
Charging box cast	*42.00-43.00*
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	*48.00-49.00*
Rails, 18 in. and under	*63.00-64.00*
Rails, random lengths	*55.00-56.00*

ST. LOUIS
(Brokers' buying prices)

No. 1 heavy melting	41.50
No. 2 heavy melting	39.00
No. 1 bundles	41.50
No. 2 bundles	35.00
Machine shop turnings	28.00
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	*47.00*
Charging box cast	40.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Brake shoes	*40.00*
Clean auto cast	47.00
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt.	50.00
Rails, 18 in. and under	65.50
Rails, random lengths	59.50
Rails, rerolling	65.75
Angles, splice bars	59.00

SEATTLE

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	*40.00*
No. 2 bundles	34.00
No. 3 bundles	*25.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	*55.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*50.00*
Heavy breakable cast	38.00
No. 1 wheels	35.00
Unstripped motor blocks	*40.00*
Clean motor blocks	40.00
Stove plate(f.o.b. plant)	*35.00*
Brake shoes	35.00

Railroad Scrap

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	35.00
Machine shop turnings	12.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	43.00-45.00

SAN FRANCISCO

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 1 busheling	39.00
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Short shovel turnings	20.00
Cast iron borings	18.00
Cut structurals	41.00
Heavy turnings	20.00
Punchings & plate scrap	39.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	45.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

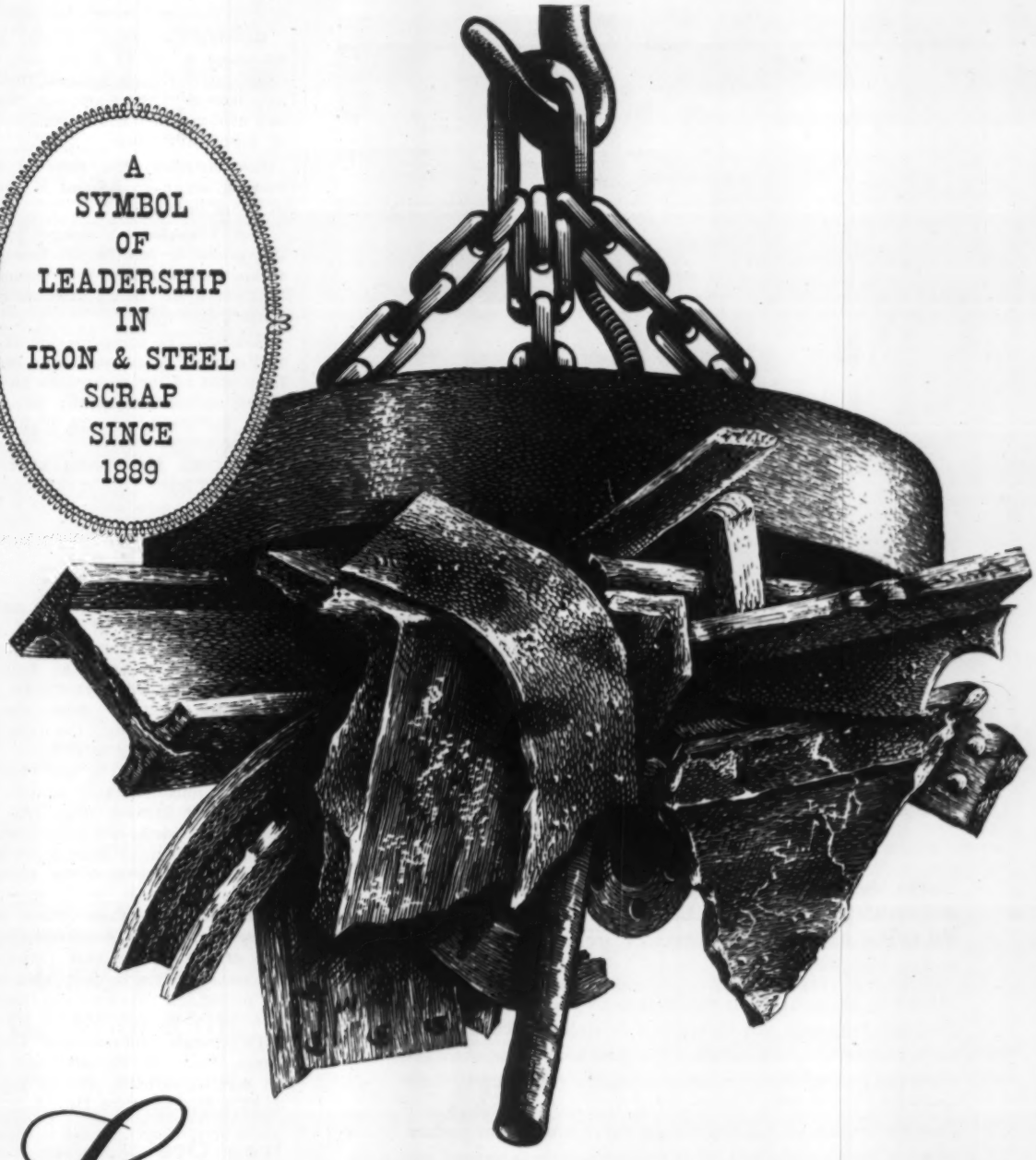
No. 1 heavy melting	38.50
No. 2 heavy melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Mixed borings, turnings	17.00
Rails, remelting	47.50
Busheling, new factory: Prepared	36.50
Unprepared	32.50
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

A
SYMBOL
OF
LEADERSHIP
IN
IRON & STEEL
SCRAP
SINCE
1889



Luria Brothers and Company, Inc.

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Philadelphia 7, Penna.

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READING, PENNA.
MODENA, PENNA.
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PITTSBURGH, PENNA.
ERIE, PENNA.

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...safely, again and again, on forged landing gear parts

You've seen big planes, weighing 60 tons or more, landing at speeds up to 120 M.P.H. Landing gear assemblies, essential to this remarkable performance, are made with *forgings* as key components.

Have you thought what this means to your product, your process? Forgings can be trusted in such critical applications because they are sound. That same soundness of forged parts can be useful to you in reducing the cost of equipment you make or use. The soundness of forgings can reduce your costs for inspection, for machining, for rejections, for replacement of faulty parts, and other expenses. Ask us to send you the booklets named below, which explain these advantages and tell you how to get a Forging Engineer's help in determining how forgings can affect your ultimate costs.

closed-die **forgings** for metal you can trust

DROP FORGING ASSOCIATION
419 South Walnut, Lansing 33, Mich.

Symbolic emblem of the Drop Forging Association

Attach this advertisement signature to your letterhead and mail to Drop Forging Association to receive booklet "What is a Forging?" ☐ or "Management Guide to Use of Forgings". ☐ Check title or titles desired.

(*Concluded from page* 169)

Birmingham—Steel scrap prices advanced $1 to $2 a ton last week when district mills entered the market for limited quantities. Dealers say cold weather has slowed the flow of scrap into yards.

Los Angeles—The flow of steelmaking scrap to dealers is reduced in some instances.

San Francisco—Pressure for rising prices is felt in the local steel scrap market, but predictions are that there will be no increase in the immediate future.

Seattle—The scrap market is firm, and demand is active. While receipts from east of the mountains have declined, collections in the local area have increased, current high prices proving attractive.

Exporters are buying at today's levels and trans-Pacific shipments are heavy.

Pig Iron . . .

Pig Iron Prices, Page 157

Sharply advancing prices and the growing shortage of quality scrap are boosting demand for pig iron. High operating rates at foundries, coupled with good prospects for large melts the next 90 days, also are factors stimulating the pig iron market.

Orders for pig iron are beginning to press uncomfortably against merchant blast furnace capacity.

Many foundries will close down during the Christmas holiday week, accounting for request for postponement of some iron shipments.

Sharon Steel Corp. blew in its Mary furnace at Lowellville, O. (it's one of the oldest blast furnaces in the world). The furnace, with capacity of 148,620 tons annually, had been idle for about 14 months.

Pittsburgh Metallurgical Co., Niagara Falls, N. Y., advanced prices on electric-furnace, silvery pig iron $5.50 a ton, effective Dec. 1.

Iron Ore . . .

Iron Ore Prices, Page 167

Shipments of Lake Superior iron ore in the week ended Dec. 5 totaled 334,421 gross tons, reports the Lake Superior Iron Ore Association. This compares with 106,817 tons moved in the corresponding week a year ago.

The week's shipments brought the cumulative movement for the 1955 navigation season to 87,419,645 tons, up sharply from the 60,793,697 tons moved in 1954.

The 1955 total is about 4 million tons above the previous high movement for a nonwar year, in 1950, and is only 9 million tons under the all-time record (96 million tons in 1953).

LARGE MACHINE AND WELDMENT CAPACITY

Open capacity on 24 ft. and 10 ft. Vertical Boring Mills 7", 5" and 4" Horizontal Boring Mills; large radials and supporting small machines including new 2 AC Warner & Swasey automatic chucking. Especially interested in producing weldments requiring machining.

C. H. WHEELER MANUFACTURING CO.
Bedgley Ave. at 19th & Lehigh
Philadelphia 32, Pa.
Phone: Henry Kingston—Sagamore 2-6500

CLASSIFIED

Help Wanted

We desire to set up our production of small steel castings on a piece-work basis instead of hourly rates. We need the services of someone who is thoroughly familiar with such an operation, capable of installing this system in our foundry. Salary open. All replies confidential. Address: P. O. Box 13294, Houston, Texas.

EXCELLENT OPPORTUNITY

For young man willing to assume responsibility. Should be familiar with production problems and have experience in handling men. Experience in tube production and cold drawing preferred. Give full particulars—qualifications, experience and present salary. Reply Box 348, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

YOUNG MAN, 30 years old, college graduate business administration, desirous of making change. Five (5) years production buying experience, and sound knowledge of buying all type of metal ferrous and non-ferrous. Reply Box 353, STEEL, Penton Bldg., Cleveland 13, Ohio.

UNDISPLAYED CLASSIFIED RATES

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Other than "Positions Wanted"

	Set Solid	All Capitals	All Caps Leaded
50 words or less	$15.00	$19.20	$23.40
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25 words or less	$ 3.00	$ 4.50	$ 5.40
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Cash with order necessary on "Positions Wanted"

Keyed address takes seven words. Replies forwarded without charge.

All classified pages are 3 columns, each column 2¼".

Forms close 10 days prior to publication date.

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Penton Building, Cleveland 13, Ohio

STEEL

for immediate shipment

I BEAMS (Imported)

200 Tons 8" @ 17.9# x 40'
110 Tons 7" at 14.72# x 35'4" & 37'4"

ANGLES

75 Tons 2½" x 2½" x ⅜" x 20'/65' (C1045)
90 Tons 5" x 5" x ½" to 8" x 8" x 1" x 20'/37'

FLOOR PLATES

160 Tons 14 Ga. to ½" x 48"/72" x 8'/30'

REINFORCING BARS

⅝" to 1¼" x 20', 30', 40', & 60'

ALSO LARGE STOCKS OF STRUCTURAL SHAPES
PLATES—SHEETS—BARS—REINFORCING MESH

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EAST CHICAGO, INDIANA

OPPORTUNITIES AND PROFITS

are of equal interest to distributors and manufacturers—use an ad on this page next week to let manufacturers know you are interested in taking on new lines.

MANUFACTURING CAPACITY OPEN

We have open time for the following operations:

1—Sheet Fabrication
2—Tube Fabrication
3—Metal Stampings
4—Cloth Cutting & Sewing
5—Degreasing—Painting—Baking

This is a low overhead plant which can mean savings for you.

KUMMETH MANUFACTURING CO.
Box 455
OWATONNA, MINNESOTA

WANTED

1—18" or 20" Roll Turning Lathe, to turn 2 rolls from single or double drive.

1—18" or 20" Roll Turning Lathe, to turn rolls single.

ROTARY ELECTRIC STEEL CO.
Box 4606
Detroit 34, Michigan

FOR SALE

One (1) Used G.E. Type M, Wound Rotor, 500 H.P. Motor, 450 RPM, 2300 volt, 3 phase, 60 cycle, Open; also four (4) Used 50 H.P. Westinghouse Induction Motors, with manual starters, 440 volt, 3 phase, 60 cycle, Type CS, two (2) having 870 RPM Style 271825, two (2) having 1160 RPM Style 235532

UNIVERSAL CYCLOPS STEEL CORPORATION
Phone P. L. GEDEON 7-2221
Titusville, Penna.

FOUNDRY RESEARCH METALLURGIST

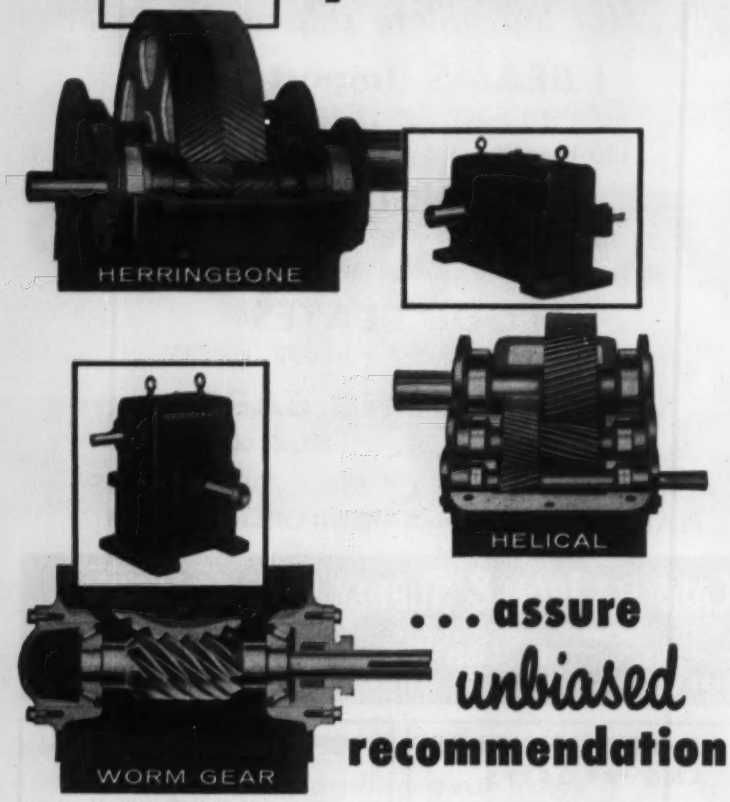
EXPERIENCED IN BASIC ELECTRIC AND OPEN HEARTH PRACTICE, CARBON AND LOW ALLOY STEELS. POSITION PERMANENT AND NOW OPEN. GIVE COMPLETE INFORMATION IN FIRST LETTER. MUST FURNISH ACCEPTABLE REFERENCES.

INFORMATION WILL BE HELD IN STRICT CONFIDENCE BY A SINGLE EXECUTIVE.

REPLY BOX 352, *STEEL*

PENTON BUILDING **CLEVELAND 13, OHIO**

3 H&S Speed Reducers



. . . assure *unbiased* recommendation

Each of these three general groups of H & S Speed Reducers has its particular mechanical advantages which make it more efficient for specific duties. There are many considerations, such as speed of driving and driven shafts, shape of housing and drive characteristics that must be considered for lasting reducer performance and economy.

With the complete H & S line of Speed Reducers to choose from, you can be sure of our unbiased recommendation and your selection of the right type reducer for each specific job.

H & S Reducers are available in single reduction units in ratios up to 100 to 1; in combination units up to 700 to 1; and in double reduction units up to 10,000 to 1.

Make H & S your source for *all* speed reducing requirements.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue
Cleveland 14, Ohio

Send note on Company Letterhead for complete H & S Catalog

Tool Steel . . .

Tool Steel Prices, Page 156

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 9418 net tons in September, reports the American Iron & Steel Institute. This was down slightly from the 8994 tons shipped in August but was up sharply from the 6269 tons moved in September, 1954.

Cumulative shipments in the first nine months of this year were 83,042 net tons. This compares with 62,934 tons in the like period a year ago.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 152

Strong demand for reinforcing steel items is indicated well into 1956. Substantial volume is seen continuing in road construction and public structures of various kinds.

Gov. Stratton of Illinois announced that his state is scheduling $127,305,000 in highway construction next year. This year Illinois alloted $123,600,000 for road and bridge building—although as of Nov. 15, contracts for only $86 million had been awarded.

Warehouse . . .

Warehouse Prices, Page 157

Undertone of the warehouse steel market is strong, reflecting low stocks, heavy demand and upward revision in some mill prices. Philadelphia distributors have advanced prices ¾-cent on junior structural sections, following recent mill increases, and are contemplating a revision in sheet and strip prices, also reflecting changes in mill prices and extras.

Distributors' stocks are so low in some districts they can't help fabricators needing emergency shipments.

Rails, Cars . . .

Track Material Prices, Page 155

Orders for 1000 freight cars were received last week by the Bessemer, Ala., plant of Pullman-Standard Car Mfg. Co. Orders since Nov. 1 total more than $20 million. Seaboard Airline ordered 500 seventy-ton hoppers at a cost of $4 million. It already has 500 cars on order at the plant, and 500 more will be built by Bethlehem Steel Co. and Magor Car Corp.

Central of Georgia ordered 500 boxcars at a cost of $3.5 million. It, too, has 500 cars on order, with delivery scheduled for March, 1956.

The Bessemer plant's heavy order backlog will keep it in full operation well into 1957.

The Atchison, Topeka & Santa Fe will lay 255 miles of welded rail next year.

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HAND PROTECTION

TOPS for QUALITY, ECONOMY, SAFETY

JOMAC HR GLOVES

- Made of long-wearing brown-and-white mock twist yarn
- Insure safe handling of rough, heavy objects
- Dependable insulation against heat
- Can be reconditioned again and again
- Interchangeable—four long-wearing surfaces with each pair
- Outwear other types of gloves by 3 to 1!

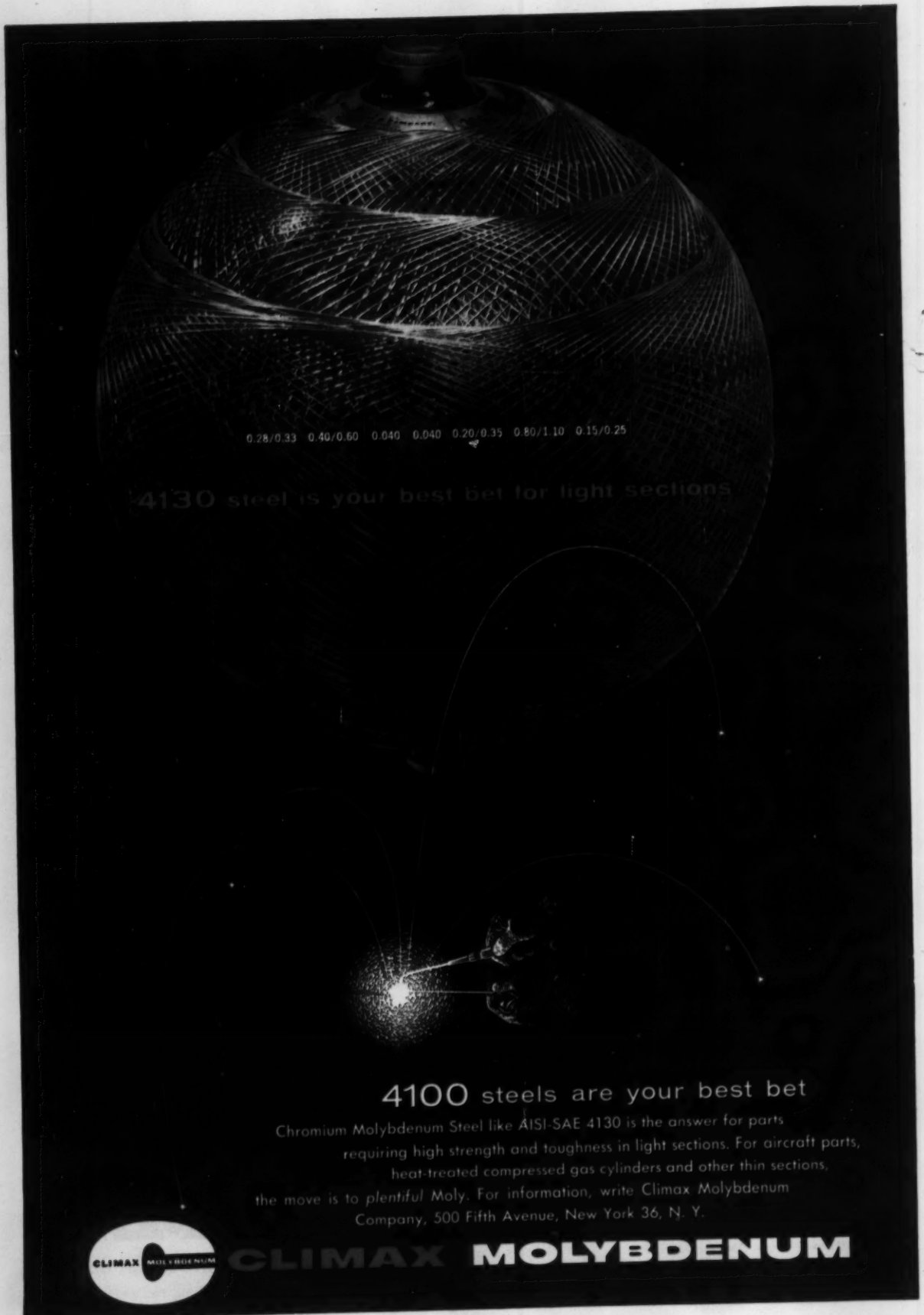
SEND FOR FREE CATALOG

Jomac manufactures all types of hand and wrist-to-shoulder protection — all made from famous loop-pile Jomac Cloth. Get your copy of the new Jomac Industrial Work Gloves Catalog. Write on your business letterhead to: Jomac Inc., Dept. E, Phila. 38, Pa.

JOMAC

INDUSTRIAL WORK GLOVES

Plants in Philadelphia, Pa., and Warsaw, Ind.
In Canada: Safety Supply Co., Toronto



4100 steels are your best bet

Chromium Molybdenum Steel like AISI-SAE 4130 is the answer for parts requiring high strength and toughness in light sections. For aircraft parts, heat-treated compressed gas cylinders and other thin sections, the move is to *plentiful* Moly. For information, write Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y.

CLIMAX MOLYBDENUM

Farval gives you economical insurance on big capital investment in machines like this Wean Trapezoidal Shear

FARVAL—
Studies in Centralized Lubrication
No. 176

DEVELOPED as an answer to the high speed blanking of irregularly shaped pieces known as trapezoids or parallelograms, the Wean Trapezoidal Shear Line reduces tremendously the cost of expensive die setup in major blanking presses. Two pieces are made at each index with accuracy only achieved by a measured length indexing system. The cut can range from 45° to 90° angles—the latter setting establishes the line as a straight cut-up unit with twice the normal production of conventional shear lines.

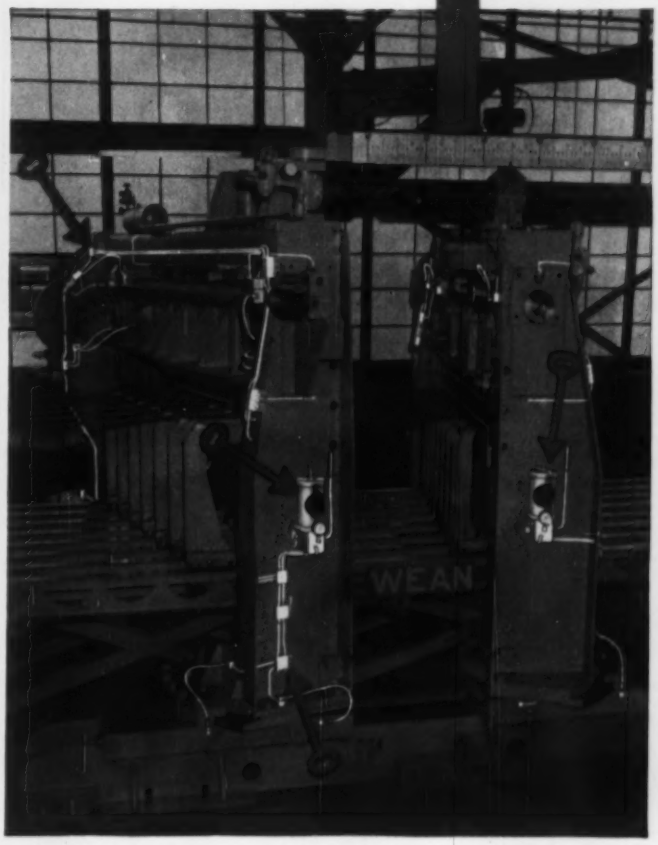
Continuous Operation

To avoid shutdowns for oiling and for bearing repairs that go hand-in-hand with haphazard methods of manual lubrication, a Farval automatic lubricating system was installed. While the machine is in full operation, Farval lubricates—eliminating downtime for oiling, increasing bearing life, and allowing higher speeds by keeping bearings well lubricated.

Farval is the original Dualine system of centralized lubrication that delivers oil or grease under pressure to a group of bearings from one central station, in exact quantities, as often as desired. Simple, sure and foolproof, the Farval valve has only two moving parts—without springs, ball-checks or pinhole ports to cause trouble. Easy-to-see indicators at every bearing show that each valve has functioned.

Find out how Farval can help keep your equipment running continuously and provide economical insurance on big capital investment. Write today for free Bulletin 26. The Farval Corp., 3270 East 80th St., Cleveland 4, Ohio.

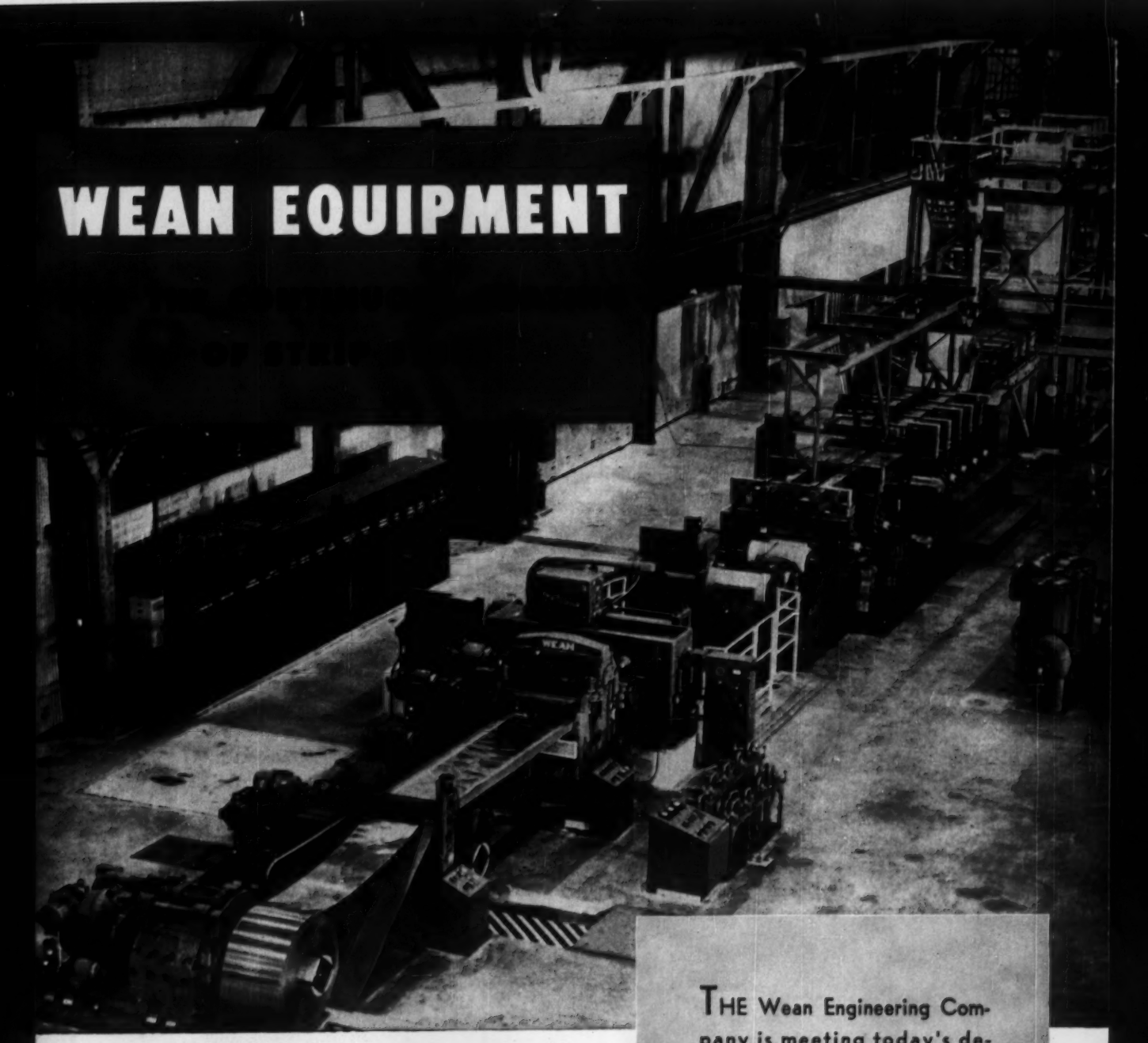
Affiliate of The Cleveland Worm & Gear Co., Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



KEYS TO ADEQUATE LUBRICATION—Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine will be properly lubricated.

Photo shows the Farval on the Wean Trapezoidal Shear Line. The continuous belt travels at high speed and the stands which support it are also Farval equipped.

FARVAL
CENTRALIZED SYSTEMS OF LUBRICATION



The WEAN ENGINEERING COMPANY, Inc.

WARREN ---------- OHIO

Associate Company—Wean Equipment Corp.—Cleveland, Ohio

THE Wean Engineering Company is meeting today's demands for equipment to produce tin plate and zinc coated strip steel with light coatings by the electrolytic method; also equipment to produce chemically treated black plate and strip steel. Equipment for coating strip steel with zinc and other materials by the hot dip method is also available.

SPECIALISTS IN SHEET, TIN AND STRIP MILL EQUIPMENT